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THE READING INTERESTS OF YOUNG ADULTS IN A MINNESOTA COMMUNITY

Harold Benjamin, Chairman,
Minnesota Study of Physical Education and Related Activities,
University of Minnesota

During the past two years, the University of Minnesota has been conducting a study of physical education and related activities in two communities of the state, Litchfield and Glencoe. The purpose of the study has been to secure information and to develop techniques for improving the programs of sports and recreation in the communities being studied and later to furnish suggestions for such improvement in other communities of our area.

We began our study by setting the following questions:

1. In what recreational activities do the people of these communities now engage?
2. What are the characteristic differences between participants and non-participants in these activities?
3. What changes should be made in the present programs by introducing new activities, discontinuing or reducing old activities, or increasing the number of participants in particular activities?
4. What are the characteristics of effective leaders in the various activities?

Back of the main objectives implied in these questions is the primary objective of making life better in the communities of Glencoe and Litchfield, and the broader objective of making life better in all our Minnesota communities, and the perhaps even broader objective of educating men and women who will be skilful organizers and directors of such community programs.

It might seem that this research is relatively limited in scope. Elementary school children, high-school boys and girls, and adults all engage in play activities to some extent. It might seem that all we need to do is study them while they are playing and find out how they may be encouraged to play better. When whole communities rather than individual children are the cases being observed, however, the problem becomes much broader and deeper. The activities of all members of the community, old and young, in school and out of school, must be observed. They must be studied not only singly and separately, but also in all their interrelationships with one another.

In studying the groups of non-participants in physical education activities, for example, we have been immediately confronted with the necessity of finding out why they are non-participants. Is it contract bridge that keeps them from playing table tennis? Does a hard day's work in a filling station make chess a better means of recreation than volley ball? Does cooking three meals and running a vacuum cleaner over the living room rugs make reading the Saturday Evening Post a good substitute for dancing?

Is listening to dance music for four hours in the evening a good substitute for playing the piano or the accordion? To what extent should pool-hall spectatorship claim one's time to the neglect of comic-strip scholarship or command of those fundamentals gleaned from Snappy Stories? When a subject is not skiing, is he resting and thinking, or is he merely resting?

It is questions like these which have tended to make our original study of athletic exercises, games, and sports become a study of a larger area of community life. Perhaps a community is sufficiently like an organic unit to make this expansion of our study inevitable. Perhaps we merely lack well-defined and well-considered limits to our research. In either event we must confess that we have not had any desire to study physical education in a corner. We want to drag it out and look at it from all sides. We want to see where it touches other aspects of community life and how it is conditioned by those other aspects of community life. We believe that if we are to make physical education function in support of our purpose to better a community, we cannot observe it in a water-tight compartment.

This will perhaps serve to explain, though it may not justify, the inclusion of a study of the reading interests of young adults among the various angles of our study. The present article is a preliminary report of observations of young adults with respect to this question in one of the communities in which we have been working.

The Community

Glencoe, the community in which these young adults live, is similar to many others in the North Central states. It is a county seat in the center of a farming area, not very important, not unimportant, not too poor, not too prosperous, not outstandingly progressive yet certainly not backward in comparison with fellow agricultural towns in this and neighboring states.

This town has a population of a little less than 2,000. The population has been increasing only slightly in the last half century. The surplus population has been steadily drained away to cities all over the United States.

Glencoe's tributary farming area cannot be defined exactly. The consolidated school district includes approximately twelve square miles of land, yet many high school pupils come in from other districts and their parents, as well as other farmers from outside the school district, make the town a center for their business transactions. The entire county has a population of more than 20,000 people, and the county seat, Rose Dale, derives the usual advantage of having many of these citizens come to town on county business.

When all the advantages are listed, however, the fact remains that this town is no place to acquire great or even moderate wealth. One who would be ambitious in Glencoe must be ambitious for something other than money.

If a young man or woman intends to remain in this community, an ambition for the sudden glaring fame which sometimes comes swiftly in metropolitan centers must also be shoved back resolutely into the realm of day-dreams. The people in Rosedale know everybody too well to be impressed by measures of fame commonly accepted in larger centers. Only a man who stays in that town for a long while, works patiently at his job day by day and month by month, makes his friends slowly but surely over the years, and leads his fellow townsmen to feel that they know him through and through and forward and backward, can ever hope to acquire real prestige. The middle-aged and older groups of Glencoe citizens, at least, are too much centered on limited and local affairs to appreciate the significance of achievement in the world outside of Glencoe. They include many kindly and intelligent persons who display an attitude in this regard similar to that of the nice old lady in another small town who met one of her numerous grand-nephews when he returned from the war where his various experiences and his rapid rise in rank had made him the subject of some newspaper comment in the neighboring large city.

"Billy," said the old lady after she had kissed the returning hero fondly, "I been so worried about you."

"You shouldn't have done that, Aunt Fannie," replied the young man with a proper degree of solicitude in his voice, all the while thinking grimly of the desperate actions from which he had emerged unscathed and, so he thought, famous.

"I jes' couldn't help it, Billy. I kep' thinkin' how awful hard them army vittles must of been on your stummick!"

A distinguished colleague of the writer occasionally returns to his native village, looking forward with delight to the question, "You still teachin' school out West?" and "How many scholars you got in the school where you're teachin' now?" Since out West in this case means any place west of the Hudson River, and the school in which this teacher works has from sixteen to thirty thousand "scholars", depending upon whether students in various types of extension work may be called scholars, my colleague is confronted with a situation in which the truth would be untruthful to the home town folks. So he answers meekly, slipping into a half-forgotten role, although he confesses that the question about scholars troubles him in more ways than one.

The community attitude in this and other respects is affected by the fact that most of the farms in the area where this group of young adults live are operated by their owners. The houses in the town and the business buildings are occupied very largely by their owners. Indeed, it is extremely difficult to rent a house in this town in spite of the fact that there has been no recent increase in the size of the population. Men do not build houses to rent; they build them to live in. Such rents as are collected are rather low. Before a man will pay high rent he will build a house. He expects to live in that town a long time anyway.

Alongside these general characteristics of stability must be ranged the fact that the community has a decreasing birthrate and a consequent decrease in elementary school enrollment. At the same time, however, the adolescent and adult population has been increasing slightly for some years. It is probably, however, that until and unless decided changes occur in the agricultural economy of the area, this community has just about reached its maximum size and importance.

The Young Adults Selected for Study

As a part of the general investigation of community interests, it was decided to select a group of young adults for special study. This group was taken from the age range of eighteen to twenty-one inclusive. The selection of this particular age group was not entirely an arbitrary matter. This is the group whose members would now be in college if they had progressed through elementary and high school at a normal rate and if they possessed the requisite means, ability, and interest for college education. It is also the first group of young people in this community whose entire remembered lives belong to the post-war period.

In order to secure as complete a samplint as possible of this potential-college and post-war group of young people, an attempt was made to locate all persons living in or having their customary residence in this community who were eighteen years old but not yet twenty-two years old on January 1st, 1936. Thus these young people were born in the years 1914, 1915, 1916, and 1917. We can perhaps place them more accurately in their proper chronological setting if we reflect that only the older ones among them were beginning to talk and toddle around when the Lusitania was torpedoed and that some of them were still babes in arms when Ludendorff directed the last great German thrust at Paris. Their memories are limited to the period of the twenties and thirties alone.

These young people are almost exclusively of Northern European ancestry. Many of them are descended from the early Yankee settlers of Minnesota. Others are the sons and daughters, more often the grandsons and granddaughters, of persons who emigrated from Northern Europe during the last third of the nineteenth century. The German element in this group is noticeable, but not particularly large. The Scandinavian element is present, but not to any degree demanded by popular notions of Minnesota's racial composition. It is a curious fact that of the 268 young men and women whom we have so far discovered in this age-group not one happens to be named Peterson, a name which fills column after column of the telephone directory in Minneapolis only fifty-odd miles away.

Location and Occupation of Group

In order to understand more completely the young people who are now living in the community and engaging only in those activities which the community affords, it is necessary to know something about those whose regular residence is in the community but who are not now staying there. Where are they? What are they doing? How did they get away from the community? Is it intelligence or mere restlessness that takes them away? Is it money alone that allows some of them to attend college, or does a fierce ambition drive them to higher educational institutions?

Let us look first at the graduates of the local high school in this group. There are 150 of them, and the fact that 93 of them are girls indicates a familiar agricultural tendency, more prevalent a few years ago than now, to keep the girls in school until they get a diploma or other evidence of culture necessary to their happiness, but to have the boys get a job if possible so that they may learn to be useful to themselves and to their fellow men. They can't learn that in high school, can they? seems to be a prevailing attitude even yet.

Let us consider the present occupation of these high school graduates in terms of two simple but relatively accurate measures of their academic achievement in high school. These two measures are: (1) age at high-school graduation, and (2) percentile rank in graduating class. The distribution of this group according to these two measures is given in Table I below.

Table I

Age at Graduation and Percentile Rank in Graduating Class of 150
Graduates of Glenroe High School Born in the Years 1914-1917:

Age of Graduation	Number	Average Percentile Rank in Graduating Class
15	1 boy	32.0
	1 girl	14.0
16	4 boys	39.5
	5 girls	57.6
17	13 boys	49.5
	30 girls	63.0
18	32 boys	44.2
	49 girls	72.7
19	8 boys	31.7
	7 girls	40.3
20	2 boys	6.5
	1 girl	38.0
Total	60 boys	42.0
	93 girls	64.5

In all groups with the exception of the fifteen-year old graduates, the girls are markedly ahead of the boys in rank in their graduating classes. It is clear that the young men who have been graduated from high school in this town were less well adjusted to school than were the young women. This condition is further illustrated by the present activities of this group. Of the 150 high school graduates, 17 percent of the boys and 15 percent of the girls were going to school. The complete distribution is given in Table II.

Table II

Occupations of 153 High School Graduates of Glencoe

Occupation	Boys	Girls	Total
Attending universities, colleges, and teachers' colleges	8	9	17
Attending business and trade schools	2	3	5
Stenographers and Clerical Workers	0	9	9
Clerks in stores	5	5	10
Garages and filling stations	4	0	4
Rural school teachers	0	5	5
CCC camps	8	0	8
Miscellaneous labor	4	0	4
Nurses	0	2	2
Housemaids	0	5	5
Married and keeping house for husbands	0	13	13
Unemployed and living at home	29	42	71
Totals	60	93	153

Summarizing this table, we find that 48 percent of the boys and 42 percent of the girls are unemployed and living at home, and 35 percent of the boys and 42 percent of the girls were employed. The remainder were attending school, as has been noted above.

Let us compare this group of high school graduates with the 115 young people of the same age who did not complete high school. Of this group 49 percent of the boys and 58 percent of the girls were unemployed and living at home, 48 percent of the boys and 40 percent of the girls were employed, and 3 percent of the boys and 2 percent of the girls were going to school.

Of the total group of 268, 23 girls and only 1 boy are married. Only 2 of the total of 123 boys are in the United States armed forces, in spite of the fact that the town is not far from Fort Snelling, the chief army force of this area. Both these boys are non-high-school-graduates and they are not in the army. One is in the United States Marine Corps, the other in the navy. Fifteen of the boys are in the CCC camps.

Study of Activities and Interests of Young Adults

This, then, in brief, is the background and composition of the group from whom the following cases concerning reading interests and activities were collected.

The information was secured by means of personal interview. The interview blank relates to occupation, economic status, musical, dramatic, athletic, and other interests and activities.

In order to present the picture of some typical reading interests in this group, it is probably desirable to look at the whole pattern of activities of particular persons. Let us examine a few cases.

Case No. 1

Boy, 21 years old, works in garage, lives at home with parents. Was graduated from high school at the age of 18 in the 17th percentile of his class.

Likes to listen to the radio every day; always tries to find comedians; favorites are Pick and Pat.

Reads Minneapolis daily papers regularly; comic strips first, then headlines, usually nothing else. Reads most of stories in Colliers and Saturday Evening Post each week. Rarely reads a book; then only in case someone loans him one. He does not patronize the public library.

Goes to movies about once a month; all he can afford. Likes comedies best. Watches high school football games in fall. Goes to dance about once a week. Plays kittenball in summer, swims occasionally in summer, skis in winter. Would like to learn to play golf. Would like to be an aviator. Has no apparent idea that reading might help him to achieve either of these ambitions.

Case No. 2

Girl, 21 years old, secretary-stenographer, lives at home with parents. Graduated from high school in 67th percentile of class. Listens to radio every day for about two hours; dance orchestras, favorites Fred Waring and Jar Garber. Likes March of Time.

Reads morning and evening Minneapolis papers daily; first the continued stories and then the news. Reads Redbook, Saturday Evening Post, Colliers, and several other magazines about whose names she is vague. Likes Redbook best because the type of stories suits her best. Reads books occasionally; stories--sometimes gets one from library.

Attends movies once a week; likes musical comedies best. Attends dances once a week.

Her greatest hobby is collecting match-books--never thought a hobby could be so fascinating, says she gets an awful bang out of match-books.

Skates; would like to learn to ride horseback.

Case No. 3

Boy, 20 years old, left high school in tenth grade, unemployed and living with parents, but hangs around a nearby filling station much of the time. Does not listen to radio much except when someone else turns on a comedian; doesn't care for music. Doesn't attend sports events, dances, or movies; has no money, can't dance. Doesn't go to church. Belongs to no young people's organizations.

Reads a great deal--probably an average in winter time of five and six hours per day. Reads full-length novels almost exclusively which other boys loan him. These are all adventure books, pulp paper, no covers. Does not go to library.

Case No. 4

Girl, 20, was graduated from high school at age of 17 in 78th percentile of class; married for two years and lives with husband in road-house, lurch-counter, beer-parlor, dance-hall combination business about three miles from town on main highway.

Listens to radio all day, leaves it turned on as she does house work. Likes dance music best and always gets it if she can find a station that has it.

Dances six nights a week as part of her assistance in the business. Reads household page in newspapers occasionally as she finds them good for new recipes. Reads nothing else. Would like to go to movies more, but gets to attend matinees only about once every other week since her husband's business keeps her tied down. Belongs to no organizations. Has no interest in any sport or game. She says she likes to cook.

These cases are not unusual, but are rather typical. The general picture of the activities of these young people includes, for those who are employed, regular attendance at dances, faithful patronage of the movies, listening to the radio for at least an hour each day and often longer, reading the comic strips in the daily papers, the sports section, the continued stories, and for the group of somewhat better than average ability some attention to the news stories, reading one or two magazines regularly--magazines of the second, third, or lesser class fiction type for the most part, and occasional attendance at some athletic event as a spectator.

For the unemployed group, this picture is in general quite similar with somewhat less emphasis on amusements which cost money, as dancing and the movies, and somewhat more emphasis on listening to the radio and reading.

Comparing the activities of these young people with those engaged in by persons of the same age-range twenty-five or thirty years ago, the hypothesis is suggested that the present group see a larger number of people, but have fewer direct social contacts, hear more people talk, but have fewer chances to respond to them, and are more mobile, but less active than were their parents in the same community at the same age. It is highly probably, moreover, although we have nothing but opinion based on the fact that the radio and movie consume considerable time, that many of these young people have less time and inclination to read than had their parents.

Perhaps they don't need to read so much as was necessary in the past. Perhaps the radio and the movie supply many needs that were formerly met by reading.

Two main factors appear to be responsible for this changed pattern of activities:

1. The young people of 1905 and 1910 had work to do. Their labor was important. Many of them were inducted into satisfying and morale-building activity by strong demands from the older groups in the community. They entered early into normal social relations with the adult community because they performed services of social importance.

The young people of the present day in this community are glad to find odd jobs to do; they are glad to work in filling stations, act as waitresses and grocery clerks, but they do not often enough feel that their work is important. They know that plenty of older people around them would be glad to get these same jobs, not for their social importance but for their pay.

The young people of 1910 felt, even when they had relatively unimportant work that they were acquiring experience which would help them later on to do work of greater significance. The young people of 1935, 1936, and 1937, on the other hand, have been too often inclined to doubt that they would ever get a job of importance. They have tended to feel that it is enough of a miracle for them to have any work at all when older persons with family responsibilities are unemployed.

This difference between 1910 and 1937 in the recognition of the social value of work is obviously of even greater force in the cases of the young people who are unemployed. The typical unemployed youth of 1910 did not want work. He was usually having a good time as he bummed his way across the country on freight trains. Hunger and cold could not really make him desperate, for he could always work for food, lodging, and clothing.

The typical unemployed youth in 1937 lacks those advantages. He usually wants desperately to work, partly because of the fact that he has never had a steady job and so throws around it the glamorous halo of the unattainable, and probably even more because he knows that the holding of a job brings great social approval. The boy who has a job is respected by his elders and admired by his associates. He can have a car, perhaps, and certainly he is more likely than his jobless fellows to have a girl.

The unemployed young woman in this community, though she may live with her parents and suffer no actual privation is hardly less powerfully motivated than her brother toward getting a job. She too craves the general respect paid to the employed person. She finds great social advantages accrue from having a little spending money. She needs money to go to the movies, to buy silk stockings, cosmetics, and the services of hairdressers. Even in the most humble of jobs, moreover, her chances of meeting other girls and boys are usually greater than when she is unemployed.

2. The second chief characteristic of the group of young people in this community today as compared with those of a generation ago is their relative passivity in social situations. Perhaps they see a thousand more people in a year than did their parents at the same age, but they see them in the movies or observe them as blurred faces in speeding automobiles. They hear many voices on many subjects, but they cannot walk up to the radio and talk to it. Their sphere of movement is tremendously widened, but their activity is at a minimum even when traveling.

Suggestions for Improving the Activities of This Group

In attempting to improve the pattern of activities for these young people, we do not start with any activity for its own sake. Because we are physical education teachers we do not say, for example, let's have these young folks engage in a lot more athletic games and exercises. Because we are librarians we do not say, let's have them read a lot more. I am speaking now of those of us connected with this research. We start first with the young people themselves, and we hunt for activities as instruments whereby the lives of these young people can be made better.

We say first of all that we desire to develop these young adults socially. Most of them dance; few of them dance well. Many of them who go to dances once a week can only walk around the floor and drag their feet to keep from stepping on the feet of the partner more than half the time. To teach them how to dance better and to encourage them to learn other types of dancing than those found commonly in this community are, therefore, immediate objectives of the new program. If the librarians and the teachers interested in a reading program will discover reading materials which will serve the needs of this new activity, girls who now read nothing but the continued stories will discover new reading interests.

Music is another widespread activity in which there is passive interest but very little participation. A chorus of mixed voices, an orchestra, small ensemble groups, should be organized among these young adults. Again, the specialists in developing a reading program should tie their work with this activity.

Practically all of the young people listen to the radio and here is the place where the main educational instruments can be assembled and used to greatest advantage. To improve the radio as a social instrument, it is necessary to add the social element of discussion, readings, and individual reports. The organization of a current topics club with a weekly meeting to listen to a radio commentator is one way in which this activity can be developed, with discussion and readings growing from the original radio interest.

No matter how great the need for a radical expansion and improvement of the activities of these young people, the new program must be built slowly and from the ground up. No effective education can start from any point except where the learners are. Each of the activities suggested, therefore, is one which is closely tied to the present interests of these young people. If a few such activities are started, they may in turn furnish a basis for other and perhaps better activities.

Summary

In summary and conclusion, therefore, we have noted that 268 young people in a Minnesota community are engaged for the most part in very limited activities having any educational value. Just to build up a pattern of reading, recreation, or any other activity is not enough. There are plenty of books and newspapers and magazines to read in Glencoe. Many of the ones which are read have no particular value to the young people concerned except to help them kill time. Much of the material read is of the kind which in time will tend to make a man culturally illiterate if he is not already in that condition. The only proper and promising way to improve the reading habits of these young people is to work on the angle of their jobs, actual or wanted, their social affairs, particularly their dances, and their radio interest. Reading that can be connected with any of these interests will get a quick attention from the young adults.

Is it indiscreet for me to add that you can't direct the reading activities of any group of young people in a community unless you know what you want done to make that community better? I hear some of my fellow educationists say that the teacher should teach tools--"have them read good books, teach them good techniques, don't worry about results to community." The more experience I have in the actual practice of teaching and administering schools, the more naive and wrong this attitude appears. A general who said to his battalion and company commanders, "Give them plenty of rations and five hundred rounds of ammunition apiece, see that their socks are not wrinkled, and that their blankets are rolled correctly; teach them how to take care of their uniforms, and give them plenty of bayonet drill; but don't, for heaven's sake, attempt to tell them where to go or what to fight," would be doing something of the same sort as the school man who tells teachers to have their learners read more and better books and magazines but not to worry about the ultimate purposes for which all reading is only a tool.

PROBLEMS IN THE INTERDEPENDENCE OF THE SENSES

Thomas D. Gutsforth, Ph.D., Consulting Psychologist, Los Angeles

The topic of sensory interdependence may be approached from a number of different points of view and may involve many problems of material and method. We are not concerned here with the popular conception of the vicarious functioning of one sense in the impairment or absence of another, or with the confusing topic of dual perceptions and mixed association of ideas. The concept back of our experimental procedure has a configurational bias, and is more readily described and illustrated than defined.

Suppose we compare the space perception of an average individual with that of a person who has been blind from birth. Both have adequate space perception, and function efficiently in spatially determined situation, within certain limits. But both logical deduction and functional analysis show each employs sensory and perceptual functions so different from the other that neither of them could give the other an intelligible description of his own processes. The similarity is a functional one, that is, each makes an appropriate response in the given spatial situation.

Functional growth and perceptual development are meaningful exclusively to the individual, but the socialized end results of such processes are, and must be, generic and translatable into intelligible behavior. This primary law of perception is disregarded by the futurists and surrealists. It is obvious that their works become intelligible only in so far as their personal symbols become socialized. A hypothetical illustration will make this point clearer. Suppose two of our best and most able teachers should exchange sensory and perceptual processes, at the same time retaining their own private meanings for experiences they no longer have. Unquestionably, both would be stark idiots or adult infants, with everything to relearn.

For the past twenty years, as the opportunity offered, I have been investigating different phases of the large and relatively unexplored field of the interdependence of the senses. Only in comparatively recent times has the field been open to legitimate investigation. Structural psychology, with its atomistic concepts of sensory and perceptual phenomena, regarded the observation of such hybridized processes as belonging in the field of abnormal psychology. Behaviorism sidestepped the problem by ignoring all forms of conscious content. The method that has proven most advantageous for the study of these problems is functional analysis, a method which introduces a constant and controlled factor into the functioning of some normal process. The method necessitates a very careful adaptation of the experimental procedure to the situation under investigation, to the end that the critical factors may be isolated and observed.

Perhaps the best way to cover the ground in the time at our disposal will be briefly to review and discuss some of the experimental results and observations. It will not be possible to treat the subject historically in an adequate fashion. However, it is well to mention that the subject has been of considerable philosophical importance, and that Gelb and Goldstein gave impetus to the serious study by being the psychological fools who rushed in where the philosophical angels feared to tread.

The genetic development of sound localization in the case of the congenitally blind child serves as a good illustration of how auditory perception and kinaesthetic space perception are dependent upon each other in developing spatial orientation to sound. I observed an eight-year-old boy, blind from birth, who was never allowed to make exploratory excursions away from his chair. Although our specialists pronounced his hearing perfect in both ears, he was unable to approach a sound with any degree of consistent accuracy. His direction was apparently chance, no more differentiated than that of a blind infant, unable to creep.

Stratton² and Wooster³, among others, have demonstrated experimentally the dependence of hearing upon kinaesthesia and vision for sound localization. At the University of Kansas, we sought to study further the effect of kinaesthetic learning upon sound localization. A sound target was shot at with a .22 caliber target rifle by adult sighted subjects with blindfolds. Throughout a series of three hundred trials, no improvement was made within a gross limit of error of about thirty degrees. However, if the slightest kinaesthetic cue, which would be of any use in bodily orientation in relation to a visual space frame, were introduced, an immediate correction was observed, which tended to remain constant.

In the field of tactual perception, it is very likely that the normal individual has practically no pure experiences of touch. To be sure, he has bodily reference, but this itself is not necessarily tactual in nature. The function of vision in what we usually identify as tactual experience is well illustrated by the following experiment. A series of partial objects was prepared, consisting of a shoe toe, the bowl of a teaspoon, the tines of a fork cut off at the shank, a black piano key, a metal door knob split in half, a tea cup handle attached to part of the cup, a set of upper false teeth set in a smooth wax base. When these objects were presented to blindfolded seeing subjects, recognition, when it was made, was accomplished by a process of completing the object visually. Blind children failed almost completely in recognition. No process of completion was made; objects were perceived as whole objects, the shoe toe was a match holder, the part of a fork was a comb, etc.

Doubtless there is a time in the life of an individual when tactual sensations and perceptions exist in their own right, but how rapidly they become submerged by the developing function of vision it is impossible to say. In an attempt to begin the exploration of this problem, we made use of tactual apparent movement, demonstrated by Burt⁴ in 1917, which, in spite of its name, is a visual phenomenon. Using a two-point kinchapt, we tested a group of school children for apparent movement. It was found that apparent movement was reported first in the age scale by the eleven and twelve-year-old children. A group of blind children at and above this age group was tested similarly, and apparent movement was definitely reported and well described. No movement was reported by those blind from birth, or from their preschool age.

2. Psychol. Rev., 1897, 4, 341-360, 363-481.

3. Psychol. Monog., 1923, 32.

4. Jour. Exper. Psychol., 1917, 2, 63-75.

In order to learn something regarding the fact that blind children who lose their sight after the age of eleven and twelve seldom show much facility in becoming Braille readers, a method was devised to test the Braille learning ability of three groups of adult sighted college students. A tachistoscope was devised to expose Braille letters in a horizontal position at any desired speed. One group of subjects were to learn a list of ten letters with an immobile index finger, using a visual comparison list of Braille letters in juxtaposition to ink print letters. The second group were to use only the ink print letters and the third group were given no visual corresponding letters. All the subjects of all three groups were unfamiliar with Braille and a large number had never known such a system existed. The first group who had the two systems of visual reference rapidly learned the identity of the exposed Braille letters. The second group slowly learned to make tactual recognition of some of the Braille letters and the third group made no progress and didn't even recognize the Braille letters in the identification test as the same forms they had been perceiving tactually. The obvious conclusion regarding the blind who loses his sight about the twelfth year is that his visual development has progressed to the point where he is no longer really able to perceive tactually, but paradoxically, in spite of total blindness, he becomes rapidly more and more visual.

It is true that the process of learning Braille letters by the tactual method represents a high degree of skill in tactual differentiation. It might be expected that sighted subjects would employ visual processes to the utmost in accomplishing it. In order to pitch our investigation of tactual perception upon a lower perceptual level, hoping perchance we might capture some of the original tactual processes unawares, as it were, another investigation was planned. Three thousand judgments were made by ten graduate students and faculty members, exploring singly each of a series of five blocks and then reproducing upon an adjustable diaphragm the visual representation of the tactually perceived size. The blocks were rectangles, their width being two-thirds their height. The largest block was twelve centimeters in height, and the smallest three.

An analysis of the data showed that the judgments made by the subjects were visual judgments, based upon visualization of the tactual stimulus. The reconstructions attempted showed that the estimated comparison suffered from foreshortening in the vertical distance, subjecting the reproduction to a squaring process. The larger sizes were under-judged, and the smaller sizes were judged larger than they were. This again is strictly a visual phenomenon. The critical test was made at the end of the experiment when the blocks were exposed visually. After having made over three hundred judgments from the tactual series, the subjects were unable to distinguish visually which size was which, although they knew each and every one of them tactually.

It is quite logical to expect that tactual perception should become visual both early and rapidly, for the eye is accustomed to perceive whatever the hand does, and, since it is a more highly developed organ of perception, it would be expected to render the less acute system impotent. However, this does not mean that vision is functioning vicariously for touch. The visual-tactual experiences are just as visual as vision itself, and it is impossible to find any vestige of touch remaining except as body reference.

It is not so easy to explain how it happens that vision is such a frequent marauder in the realm of audition. However, it appears that this is not an infrequent occurrence, but rather that it is what is happening with all of us all the time. However, it is only in the extreme cases that it becomes noticeable and observable. At the University of Kansas, we wished to discover how much auditory perception was influenced by visual factors, so a German experiment was repeated. With three hundred sophomores as subjects, over three thousand tests were made, and it was found that when comparisons were made between higher and lower notes, made by a Stern variator, sounded in the dark and sounded in bright illumination, the group tended strongly to judge notes as higher under conditions of illumination and lower when heard under conditions of darkness.

Nothing short of a volume or two could handle the general subject of synaesthesia adequately. All that will be possible here is to touch some of the high spots and treat the subject in general as a normal development of perception rather than as some freakish confusion of sensory and perceptual processes. First of all, it is necessary to ask how frequently synaesthesia occurs in the average population. Professor Calkins, in her study, estimated the prevalence at about twelve per cent, but we must remember that her study was made under the influence of structuralistic and atomistic psychology, and that synaesthesia is something which must be regarded relatively, rather than in an absolutistic manner. Among the several hundred cases I have investigated, I might select several as a standard which would put the ratio down to one-tenth of one per cent, or lower. However, on the other hand, I have found in a place where it would hardly be expected the percentage of pronounced and definite cases as high as sixty-one per cent. This happens to be among the adventitious blind of high school age.

In other words, synaesthesia is a perceptual phenomenon which extends from the extreme case who knows absolutely nothing but visual processes down to the so-called normal, and I have just about reached the conclusion that the normal adult is very near to being one hundred per cent synaesthetic, and that is only because of faulty self-observation that he fails to be aware of it.

Miss A. is what might be called an extreme case. When she was three years old she was observed by her parents to be engaged in a very foolish form of play. She would pick up her colored alphabet blocks, peer intently at one of the colored sides, and then place it to her ear and listen. At the age of eighteen, she was referred to me as a problem case by both the art and music departments of the university in which she was a sophomore. Miss A. had driven both her painting and piano instructors distracted by insisting that the former should listen to the harmony of color compositions to determine their suitability, while she quarreled with her piano instructor over her contention that the only way to determine the harmonious composition of a chord or movement was to observe the color pattern it made. Both instructors recommended that she visit the psychology department. It was found that Miss A. was very able both in painting and in music, but unfortunately for her and still more so for her instructors, she simply had only one sensory modality for every sensory function, and that was vision. She heard colors and saw tones because there was nothing but a difference of bodily reference to distinguish one from the other.

It would be possible to multiply cases indefinitely, showing how one differs from another, how one employs colored emotional attitudes, and how others employ eidetic imagery and personification and dramatization in their imagery; and yet we would be no closer to the cause and true nature of synaesthesia.

Professor Jastrow called attention to the gradual diminution and fading out of visual processes in the adventitious blind. He leads us to believe that the visual component gradually leaches out of the imagery of the blind who have lost their sight after the age of six or seven, and that the old original tactual, kinaesthetic and auditory processes become stronger and finally dominant. Professor Jastrow is right to this extent, that concrete visual imagery does go through a fading process, becoming more fragmentary and fleeting, and losing its original definiteness in coloration.

It must be recognized that vision is the most efficient form of perception, for it has more perceptual functions and more discriminating categories than all the other senses put together. It has size, brightness, color, tridimensional spatiality, direction and mobility, to say nothing of an infinite number of combinations of these characteristics. That is why I wish to insist that we must consider one possibility seriously; that is, whenever the human organism has once employed vision to any extent, the visual function is never lost, regardless of the age at which sight may have been lost. That is why patients who have been operated upon for congenital cataract report a visual space frame, for if they haven't enough retinal activity to perceive light and shadow, the operation is useless, and obviously every perception of light and shadow has its spatial attributes.

Now suppose a child loses its sight somewhere between the ages of eight and fourteen years, after there have been several years of visual stimulation and active visual perception. In spite of the fact that visual imagery does appear to fade and lose its vitality, visual activity is freed from concrete verification, and thus, unhampered by conforming to visual realities, it may capture in a very short time every sensory modality. That is why it is possible to say that the larger percentage of blinded children are in a sense more visual than the average seeing child. This is a mechanism or process well worth understanding, for it is applicable in some degree to any school child.

If, for example, a child who has recently lost his sight is given an apple, he will perceive it in terms of a rather clear visual image. However, as time goes on, a similar experience will take on new visual qualities. The child will perceive the coldness of the apple, and in some manner, sooner or later, the tactual coldness of the felt apple may be represented, for example, in the visual image as a bright high light on the apple, or as a smudge of color in it. Likewise the qualities of hardness, softness, weight, smell and even taste may be represented visually. This can occur easily with the blind child because he is unable to perceive through verification that those qualities are not actually visible in the object as seen. Thus an entire new visual world may be built up for the blinded child, perhaps infinitely richer in coloration and more uniform than that which the seeing child is required to build. It has been established definitely that the visual development of the blinded child does not stop on the perceptual level, but may come to include the whole intellect. In some cases, thought processes, both concrete and abstract, are carried out

by means of a weird combination of fragmentary concrete memory images and meaningful abstractions of form and color which are often kaleidoscopic in their movement and variety, and which often involve personification and dramatization.

There is every reason to believe that similar transitions between perceptual modalities occur normally in seeing children. Dr. Fernald's⁵ work with non-readers has opened up a whole range of practical and theoretical problems in the relations of visual to tactual and kinaesthetic perception. Perhaps the most important function of the modern teacher is to accompany, as it were, the developing child through the critical period during which he is changing from the poly-perceptual equipment of early childhood to the more unified and systematized mode of adult perception. What a simple and delightful task teaching would be if we teachers could have been aware of the perceptual changes we went through, and could remember them step by step.

5. Mental Measurement Monographs, 11, 1926.

TEACHING READING IN THE HIGH SCHOOL

Harl R. Douglass, Ph.D., Professor of Secondary Education,
University of Minnesota

We have gone a long way towards becoming a reading nation. I can recall when the average person read only a weekly newspaper, or an occasional magazine. Now he reads at least one large daily newspaper, one or more weekly magazines like Time and The Nation, besides one or more of the numerous monthly periodicals. I wish I could give you the figures of the increase in the subscription or circulation lists of such types of publications. It used to be that a man who read the Atlantic Monthly was considered very high brow; now he is most definitely a low brow if he does not read the Atlantic, Harper's or a journal of that type. We have become much more a reading nation in this respect.

The amount of semi-scientific literature has increased by leaps and bounds in recent years. Semi-popular books and treatises in literature, politics, economics, religion, have characterized the output of presses in the last two decades. We have journals on every conceivable subject. We go to books to learn everything that we must know. We learn to cook by reading, how to play bridge and golf, how to hunt, how to garden, how to dress, how to travel, even how to make love; everything we learn to do we learn by reading. Reading is no longer merely an elementary school subject. We need to re-define the term. I think that we ought to stress reading much more as a type of thinking about the printed material rather than as a matter of mere eye movements; it is something more than a mechanical process, more than an elementary school reading lesson. Possibly it is a question more of how to study, how to react critically to what is read.

A certain Senator Eddy of Oregon attempted to get a bill through the legislature of that state requiring all high school teachers to teach book-keeping, arithmetic, reading, and spelling. He thought the students ought to learn how to read, write, and figure better. I think possibly the Senator really had the right idea. Of course, the high school teachers were highly incensed and refused to even think of such a program. Reading to them was an elementary school subject. But we do need to teach the students how to read better, how to increase their vocabulary, but with this difference; the teaching must be done in a more advanced method, with a scientific basis; not exactly the same type of teaching that is done in the elementary schools. The greatest single service a high school teacher can render his or her students is to teach them how to express themselves, how to reduce their thoughts into words, to express themselves in clearly defined concepts, making words their servants.

Mabel Wagner of the University of Buffalo has found through experiments that there is a rather high correlation between reading ability and the degree of college success. She found also a correlation between reading ability and the extent of vocabulary. To insure students of college success, get them teachers who can teach them to read critically. Wagner found also that reading ability correlated more highly with science grades than with grades in any other field.

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Thus it seems really worth while to teach reading. There are two kinds of reading taught in the high schools. The first is called literature and I mean literature in quotation marks. Our literature classes must not be made up of nothing but "literature". All people will not or can not read "literature". Moreover, most people do not read "literature" after they leave school. Teach literature for the philosophy that is in it, for its beauty, or for the psychology that you find there. Shakespeare has more psychology in his plays than most elementary psychology books have.

In the teaching of reading we must recognize individual tastes and abilities. Some students in the seventh grade are ready for, some even beyond, the ninth grade reading program. In other words, don't put just ninth grade reading materials in the ninth grade. Put in some things that are on the tenth, eleventh, and twelfth grade levels. Some of the students are ready for it. Some other ninth graders are not yet ready for materials of the eighth grade level. To force them in the development of their tastes is almost certain to cause them to hate reading and literature, and all mention of English as a subject. We need to remember that there should be gradual growth in reading, as in other things.

Possibly I can illustrate this a bit by the story of the boy who was trying to get an appointment to the naval academy at Annapolis. This boy was just a little bit too short, and would be rejected if he did not add the required half inch to his height. Everyone in town was interested in this boy's problem and was anxious to see him get the appointment. The newspapers became interested and publicized his story. Everyone sent in recipes and one sent in a stretching contraption which he insisted would help the boy to grow taller if he would but follow the instructions. If he would only use this particular harness twice a day, he could not fail to add the extra half inch to his stature and be admitted to the academy. I think that there is a much better chance of making this boy stretch out by use of that harness than there is of increasing a youngster's intellectual and cultural stature by giving him too much high class "literature" to read.

In regard to the remedial aspects of reading, it has been found by experiment in a New York City high school, that the reading ability of a student can be increased one and one-half years in one semester of remedial instruction. In another study ninety per cent of the students who were given remedial work showed improvement, and only fifteen per cent showed regression later. In Minnesota in the Edison High School a graduate student of mine took a group of pupils for a short time during the noon hour and gave them remedial work. She was able to bring some of them up one full grade, and others showed a great deal of improvement. However, we find that the students' grades as a whole do not improve so much as the reading ability has improved.

Certain changes in American life have operated to make the training for critical reading much more important than formerly. Not long ago I was present at a ceremony dedicating a monument to William McGuffey. McGuffey, of course, was the first man to give us a really first-class series of graded readers. His readers had a character content in the reading selections, which is more than we find in some readers today. And I got to thinking, do we really owe so much to McGuffey after all? Have we done the wise thing in making all people readers? In doing so we

have put a halter around our necks and the end of the rope in the hands of those who write. Today, people are all taught to read, in one sense of the word, but they don't know how to discount what they see in the newspapers or otherwise to evaluate properly what they read. The propaganda during the World War is a most flagrant example of how the people were led to believe just what the newspapers wanted them to. And that sort of thing has grown by leaps and bounds in recent years.

In the last campaign the newspapers were not interested in telling the American people the truth about the issues. They were interested primarily in getting the people to think the way they wanted them to think.

Teach youngsters to recognize the interests of both the buyers and of the sellers. Train them so that when they go out they won't have themselves made fools of as we have been. It is the duty of the teacher to train the students for life in a newspapers' world. It used to be the code of ethics of the newspapers to print the news in an unbiased manner, reserving the editorial columns for the argumentation and stating of opinions. I don't know of a big newspaper today that follows that code of ethics. Personal bias and prejudice has gone beyond the editorial page and you find it on the front pages now, mixed in with the news.

The American public school was established primarily for the purpose that the American ideal of democracy could be a success. Until we do this we have not satisfied our first responsibility. We have not played fair. And we can not satisfy that responsibility so long as we prepare the youngsters that leave our schools in such a way that when they go out they can be led around by the Huey Long, the Al Smith demagoguery, or the Townsend Technocracy, or Plenocracy fallacies, the Father Divines, or the Father Coughlins. We know it is hokum, but the surprising thing about it is that a great number of people are taken in by it. These are not the only forces which use the newspapers to formulate public opinion. The vested interests and the people who have large sums of money invested are just as prone to play upon the imagination and the lack of discriminative powers of the masses. These are just some of the things we will have to work against.

In conclusion, may I say teaching people to read in the sense in which I am discussing it is one of the most important tasks of the high school teacher. What I have said applies also to consumer education as well as to citizenship education; it involves not only the mechanics of reading obtained in the elementary schools, not only intelligence, but it also involves getting a background in the social and natural sciences.

We must make it our business to see that the youngsters acquire that critical ability so that they know how to discount what they read; so that they will know that not all they read is the truth; so that they won't believe everything that they read. Our responsibility is to the youngsters and to society as a whole, not to the pressure groups and newspapers.

A PROGRAM FOR DIAGNOSIS AND READING DEVELOPMENT

Maud Wilson Dunn, Ed.D., Coordinator,
Curriculum and Child Welfare Department
Long Beach Public Schools

Long Beach has a school population of 26,594 exclusive of the adult education program. The community is largely American in culture; especially from the Middle West, with a few Mexican, Japanese, and Negroes scattered throughout the schools. In addition, Long Beach is both a tourist city and a navy port. These latter two conditions mean that there is considerable turnover in our population. The school enrollment reaches its peak about the sixth month of school. In economic background, the population ranges from the destitute migratory to the well-to-do retired people.

Within such a setting, should there be a reading problem as such for the schools? At various times school people and lay individuals have stated that pupils cannot read. Is this statement justified as a generalization?

The schools are organized into the following segments: Kindergarten, elementary grades 1 to 6; junior high grades 7, 8, and 9; senior high grades 10, 11, and 12; and junior college grades 13 and 14. In the elementary segment the core is the unit of work; but the maintenance of skills in a unit of work is recognized as part of the educational program.

May I say here that this paper is not the report of a reading specialist, nor that of a medical person. It is written from the viewpoint of the Coordinator of Curriculum and Child Welfare interested in giving an overview of the Long Beach reading program as shown by its instructional procedure and guidance techniques.

The results on the New Stanford Reading Test Survey for the years 1933-34 to 1935-36 have been as follows in grades 6A and 9A:

New Stanford Reading Test Survey, Grade 6A

	<u>Dec.1933</u>	<u>Mar. 1934</u>	<u>Nov.1934</u>	<u>Mar.1935</u>	<u>Nov.1935</u>	<u>Mar.1936</u>
Norm	6.7	6.5	6.6	6.5	6.7	6.5
L. B.	7.0	6.8	6.8	7.0	7.0	6.8

New Stanford Reading Test Survey, Grade 9A

	<u>Nov.1933</u>	<u>Mar. 1934</u>	<u>Nov.1934</u>	<u>Mar.1935</u>	<u>Nov.1935</u>	<u>Mar.1936</u>
Norm	9.6	9.5	9.6	9.5	9.7	9.5
L.B.	9.2	9.7	9.5	9.7	9.7	9.7

According to the findings in these surveys, the city standards are equivalent with the norms, which would mean that Long Beach averages are the same as the averages for the country at large. From an administrative viewpoint, this is satisfying information. However, from a guidance viewpoint, we are not concerned with averages, but with dispersions; i.e., the individual who is above the average and the individual who is below the average. Further on in this paper the guidance phase of reading will be discussed.

It would seem advisable here to explain the Long Beach reading program in general before discussing the special guidance services available to the teacher.

Among the committees appointed last year to make recommendations on various phases of the elementary program were two on reading; the Committee on Initial Reading, and the Committee on Remedial Reading. On these committees were teacher, principal, and supervisor representation.

The Committee on Initial Reading made not only a careful study of the researches in reading, but also conducted an independent comparative study of five reading systems including the State Series. "The Committee was guided in its study by criteria used in scientific investigations to aid in selecting and evaluating readers for basic reading programs." According to the findings of the Committee, the State Series as a basic text is too difficult for primary children.

In the primary book, and even Book I of the State Series there is not only a wide range of vocabulary but also little repetition of this vocabulary. The Committee therefore recommended a series to accompany the State text which had a more limited range of vocabulary and more frequent repetition of this vocabulary.

In addition, the Committee also made five recommendations for the effective installation of the series:

1. That all the elementary principals and teachers concerned familiarize themselves with the new system through the use of the teachers' guidebooks accompanying the series and through group discussion.
2. That the elementary supervisors conduct a series of meetings with the teachers concerned to discuss teaching procedures relative to the methods of instruction in the use of this series.
3. That frequent classroom visitations be made during the reading activities for observation and discussion of procedures as they develop from time to time.
4. That in various school buildings demonstrations of good teaching procedures be given under the direction of the general elementary supervisors.
5. That some time be reserved in the principals' meetings for discussion with the Superintendent regarding the problems and the progress that is being made in the interpretation and execution of the new series.

All of the above recommendations have been put into effect during this past year. Teachers' comments indicate an enthusiasm for the new series.

Next year materials will be made available for those children whom the reading readiness tests and the teachers' judgments indicate are not yet ready for formal reading.

During the current year as a part of the supervisory programs for the kindergarten-primary grades, a committee on reading aptitude tests was organized "to study reading aptitude tests now available and to recommend a test which might be purchased for city-wide use with at least the most immature 1B entrants".

On this committee were two elementary principals, a counselor who had tried most of the available tests, the supervisor of kindergarten and primary grades, the supervisor of testing, and two teachers (one kindergarten and one primary). The following tests were studied by the committee: The Metropolitan Readiness Tests, The Monroe Reading Aptitude, the Betts Ready to Read Tests, and the Van Wagenen Reading Readiness Tests. The committee recommended that the Detroit First Grade Intelligence Test be administered as usual to all 1B entrants, and that doubtful cases be given the Van Wagenen test, such pupils to be observed this coming year. Some of the reports on the use of Van Wagenen to date state that it is time consuming for use with immature pupils. A few schools decided to postpone testing until the opening of school in the fall because of population shift and pupil growth during the three months summer vacation. Further study of the entire subject of testing for readiness is to be carried on along with careful observation of those tested during the next school year.

In the secondary schools, junior high and senior high, there is definite recognition that the teaching of reading is a responsibility of these schools. Tests used in junior high are Sangren-Woody Reading Test, Progressive Reading Tests, and the Stanford Reading Survey given to all 9A's. The Junior High School General Supervisor this past year supplemented his visits with bulletins on the psychology of reading, the teaching of reading, and the improvement of reading.

The Senior High School General Supervisor in sending out a bulletin to teachers on Directing Study in Senior High Schools accompanied it by one on Classroom Procedure in Teaching Reading in the Junior High and Senior High prepared by Miss Carol Hovius, author of Printed Trails, now head of the English Department at San Benito High School and Junior College and formerly a Long Beach teacher of English.

One of the high school English departments has been using 18-week organization units involving factors of reading and the Language Arts Department through the study of derivatives relates the literature of the English classes to that of the modern foreign languages. Another senior high school, for a period of three years has been making a very definite attempt to integrate the social studies and English for sophomores. The greater part of the first semester is devoted to tools of learning. These are in the nature of dictionaries, vocabulary studies, derivatives, outlining and guides to study--all definite factors in reading.

The preceding pages describe in general the Long Beach Reading Program for class instruction. The remainder of the paper will be devoted to a discussion of the diagnosis and treatment of children's reading problems.

We now return to the Committee on Remedial Reading referred to earlier. This committee prepared data on over 6,500 children from grade 2A through 6A based upon reading tests given the preceding year or upon careful estimates of probably increments of growth of a previous test.

The survey revealed, as might be expected, a wide range of reading ability prevailing in each grade level. Many pupils were able to read in advance of the skill required for the work of the grade in which they were enrolled. If those pupils one term below, at grade, and one term above are considered at grade, then 56 per cent of them were at grade, 20 per cent were two or more terms below grade, and 24 per cent were two or more terms advanced, according to the reading test data.

However, since this committee was one on Remedial Reading, its work was devoted to the 20 per cent below standard. As stated in their report:

"The problem of this committee, however, deals with those pupils who are not able to handle adequately the standard reading material provided for their grade. Some of these pupils require nothing more than an adjustment of material and instruction to suit the level of their ability. Some require in addition to this service, the correction of one or two clearly defined reading difficulties. Still others are handicapped by a complexity of deficiencies that can be overcome only by skillful individual or small group treatment. The remoteness from the grade standard, however, is not necessarily an index of the amount or character of the reading treatment that will be required.

"It is the consensus of opinion of this committee that only through the individual study of each pupil markedly retarded in reading can one determine into which of these classifications he belongs or the probable length of period that will be required for him to bridge the existing gap."

Among the recommendations of the committee were the following: ascertain the pupils deficient in reading, analyze the causes for reading deficiencies, prepare materials for use in remedial instruction, acquaint the parents with the child's reading status and the procedure followed to improve it, and ask for the active cooperation of the parent in the procedure.

The recommendations of this committee are the foundations, in part, for diagnostic and treatment procedures of children who need help in their reading. The following account of a reading experiment with thirteen children in a 6B class will illustrate this statement. One of the counselors working closely with the supervisor of intermediate grades carried on a remedial reading program during the second semester of 1935-36 with thirteen 6B pupils who had third grade ability. Data were gathered on each pupil as to age, IQ, reading grade as determined by the Gates Silent Reading Test, and the teacher's rating, entrance into the Long Beach school system, history of progress, health report on eyes, posture, teeth, weight, tonsils, home conditions, attitude toward reading, and remedial materials selected to help the child to learn to read. The Keystone test

was used with every child in this experimental group. Seven had eye difficulties, five of whom were advised to see eye specialists for correction, and three of them did. The test was valuable not only for revealing possible vision difficulties but also for indications of neurotic tendencies. Six reports were made about each of the pupils, after the experimentation began, including an analysis of the individual reading test, the findings on the telebinocular, teacher's observations, pupil's reading. The last report gave the gain each pupil had made from seven weeks of intensive individual help. The Gates test repeated showed the following ranges in gain:

General Significance--Type A	2-16 months
Predicting Outcomes--Type B	4-22 months
Following Directions--Type C	2-23 months

Below are the counselor's comments on the experiment. "I feel that the gain in self-confidence was the cause for the unusual reading growth." The supervisor closes the report with these words: "The difficulty experienced in finding material not previously read by the pupils has led us to draw upon some of our social studies books. . . . The group is at present reading one about the fourth grade reading difficulty."

A follow-up on these thirteen pupils at the end of this semester shows that four are making normal progress, two are above average in their work, two need more help, one has had his bad home situation improved and also has obtained glasses, four have left the city.

Two methods are in general use in the elementary schools for classes organized to help pupils improve their reading. One is to break down grade lines during the reading period. All children are grouped at this time according to their reading ability. This means an exchange of pupils and the emphasis is upon teacher instruction in such an organization. The other plan is to keep the class in as organized but call upon pupil tutors (the superior readers) to help their poorer classmates. The schools use whichever plan seems to best meet the needs of their situation.

In the junior high school field the general supervisor followed up on the 6A New Stanford Reading Test survey for all pupils who were below seventh grade reading standards. During the year special classes were organized in some of the junior high schools to help such pupils. Classes were established either within the regular class grouping or were specially organized comprising not more than twenty pupils. Counselor and teacher worked together in studying the causes of the reading difficulty. That the neglect of oral reading has resulted in a careless enunciation is easily revealed through the administration of the Gray Oral Reading Test. The supervisor of the intermediate grades cooperated with the junior high supervisor by lending her materials on phonetics prepared for those elementary pupils who have no basis for self-help in the identification of new words. In addition to bulletins sent junior high school English teachers, lists of books for junior high pupils that were of elementary grade level were also sent to the teachers who were working with these special cases.

Following is a summary of an experiment in one of the junior high schools in a literature class. The teacher had recognized that home and social life are affecting the reading habits of pupils; that when poor readers arrive at the junior high school they have a decidedly negative reaction toward the whole reading process. In her opinion, pupils at this age need to analyze their reading difficulties and to be given techniques that they may employ to overcome their difficulties.

Accordingly this teacher set up methods for handling the three phases of the problem as stated above. Letters were sent to parents asking that they listen to fifteen minutes of oral reading daily; in some cases parents were interviewed in an effort to enlist them in making the home a quieter place for reading and study; the use of the radio was discussed with pupils; the best moving pictures were recommended. Free reading classes in the school library are scheduled for all pupils at this junior high school, and in this class discussions of good books to purchase for the home library were held just before the Christmas holidays in an effort to place more reading material in the home.

For those children who dislike reading, all types of hand work, such as posters, murals, wood work, clay modeling, and weaving were used in the various academic classes. Handwork with academic work aids the pupils to overcome their negative attitude toward reading.

To enable pupils to diagnose their reading difficulties, conferences were held with each pupil to help him to analyze the graph showing the results of the Sangren Woody test. At this time a method of procedure was decided upon and each pupil set about to help improve himself. A second test three months later called for a second conference. At this time the pupil took stock of his gains and proceeded toward further improvement. During this three months period, the range of improvement was 6 months to 2 year and 3 months for the group that entered junior high school last September.

Teachers in other subject fields were notified of these group weaknesses so that they might assist in drills in vocabulary, reading for facts, organization, and the like. All departments taught reading where necessary.

Among the summary statements made by the teacher of these pupils is the following: "We find a greater increase in reading ability when all departments stress reading than we do by setting up a special individual reading lesson of fifteen minutes several times a week with a special teacher."

Besides general supervision, counselor service, and the use of paper and pencil tests, other special services in diagnosis and recommended treatment are also available to teachers.

First to be mentioned is the telebinocular. A nurse inspector gives one-half time to the elementary schools to test those children who are referred to her either by the teacher, counselor, school nurse, principal, or parent. This service was announced last year through a bulletin issued

to the elementary schools by the school physician who is also Supervisor of the Health Service Department. The policy was to complete a survey of one school before going on to another and practically every elementary school took advantage of this service. The examination was limited to vision and did not cover a test on reading readiness. One copy of the findings was left in each school for the nurse; the other was sent to the home.

Of 32 children referred in a small school, 15 were recommended to consult an eye specialist and during the year 6 did; 6 children were seated in the front of the room to be rechecked later; 3 had faulty reading habits; on 4 there were negative physical findings; 2 had headaches due to chorea and allergy; and for 2 the reliability of the test was questioned.

In another elementary school representing homes of greater economic security and better social conditions than the above, only 8 out of 40 children referred were refraction cases; and when the reports were sent home, all 8 children had been fitted with glasses by the time the nurse called upon the parents to follow up on the recommendations.

However, where orthoptic training was recommended (fusion difficulty for muscular exercises) many parents could not afford the expensive treatment.

In the junior high school and the senior high school, the school physician administered 300 telebinocular tests. All of the junior high schools had some service, and two of them considerable. Good use was made in the senior high schools of this service. Out of these 300 cases, 80 per cent of them were negative physical findings. The predominating problem was emotional difficulty in the junior high school and senior high school. The experiment with the 13 children referred to previously revealed the beginning of these emotional difficulties which become more acute as the pupils with a reading disability move on to junior high school.

In addition to the telebinocular tests, audiometer tests are also available through the Health Service Department. This past year, 3 schools have been completely tested with the 4A for every child in grades 3 through 6. The 4A audiometer tests groups of 40 and segregates those who have hearing loss up to 30 per cent. If any child failed on two out of the four tests given at one sitting, he was retested by the "4A" and if he failed a second time was then tested with the 5A audiometer which tests an individual for one pitch only. A report of these findings was also sent the parent.

Next year it is planned to test all children in grades 4A, 5A, and 6A with the 4A audiometer and to follow up the 6A audiometer on those cases needing more careful investigation. The slightest sound that a person under the test can hear at a given pitch or frequency can be measured with a 6A and in addition to test for air conduction, the "6A" also tests for bone conduction.

Through the use of the audiometer and the telebinocular, we hope to discover early in their educational career those children who should be placed in front seats, encouraged to consult eye specialists, and also those

who should be placed in special classes for instruction of the physically handicapped.

In Long Beach, classes are maintained in an elementary school and a junior high school both for those in need of sight conservation and the Braille pupils and also for the hard-of-hearing and the deaf. A committee studying the guidance needs of special classes for physically handicapped children stated that apparently only one-half of the children in need of sight conservation and Braille services were in such classes, and that only one-twentieth of the hard-of-hearing who probably need treatment are in these classes (according to national statistics). This latter situation is quite likely due to the fact that only the deaf and not the hard-of-hearing have been located in the regular classes, and secondly that many parents and children feel that there is a stigma attached to wearing the instrument that aids in hearing.

From the mental hygiene viewpoint, the early discovery of such physically handicapped children is important in order to prevent later maladjustment. This is illustrated e.g., when in a class of 17 hard-of-hearing children last year, 3 of them had no reading ability at all according to the instructor. These 3 children soon after their arrival in the junior high school became known as behavior problems and were referred to the counselor who in turn called in the nurse for consultation. The nurse suggested referring them to the instructor of hard-of-hearing children who quickly discovered their physical handicap and the need for much help in speech. She started out to teach these children in the same way as if they were just entering the first grade. At the end of seven months of special help, these three children had read four primers, six first grade readers, twelve books from the second grade browsing sets, easy books on geography, and stories of people and the newspaper. At school they enjoyed reading aloud and at home found satisfaction reading short articles from the newspaper to their parents. According to the teacher, the first time these children were able to read a few pages they were almost ecstatic with joy. Needless to say, behavior difficulties disappeared.

Another type of mental hygiene problem exists among the children in the sight conservation classes. This group includes those having a visual acuity of between 20/70 and 20/200. To the Braille classes are assigned the children who see at 20 feet what they should see at 200 (visual acuity 20/200).

The myopes are usually great readers even in the elementary grades. The school policy with these children is to discourage reading on their part and to interest them in games and other activities that do not require reading from the printed page having 12 point type or less. Instead the instructor reads to such children. When a whole school program is geared to emphasizing interest in reading, it can well be seen that to belittle such interest is a real problem. This is especially true when many of the children have inferiority complexes.

The preceding pages of this paper have dealt largely with the pupil. What about the school environment? Adequate lighting, the amount of glare, and the facilities for the maintenance of good posture must also be given consideration from the standpoint of the reading problem.

Now to bring this paper to a conclusion, what are the implications for diagnosis and reading development? There are at least 5 points that might be made in summary:

1. A well-planned reading program carefully installed will bring such good results that teachers will be enthusiastic over their success.
2. A rather extensive diagnosis of reading difficulties, with plans of treatment thoughtfully worked out will bring results even during a semester.
3. Early discovery of physically handicapped children in regard to sight and hearing is important to prevent emotional maladjustment both in the elementary and secondary schools.
4. Reading materials are usually too difficult for the grade for which they have been published.
5. Advancing knowledge and improved techniques are revealing that reading difficulties are too complex to be over simplified by a statement that a pupil has a low IQ or is a disciplinary case.

Finally in conclusion what are the possible next steps for Long Beach:

1. An educational program with parents, P.-T.A., and parent-education classes to acquaint them with the possibilities of both preventing and removing reading handicaps.
2. Continued research on reading materials for better gradation on the basis of interest and difficulty and illustrations that will meet the needs of older children.
3. Extension of the Child Guidance Clinic service to include a reading clinic.
4. Greater recognition among educators that psychological, physical, pedagogical, and personality factors may all be variables in a reading handicap.
5. Greater recognition that unless reading handicaps are removed early in the educational career of a child these may develop into emotional complexes that will take more time eventually to discover the source of the problem.
6. Recognition that society demands greater skill in reading today than it did in former generations, and that the school must make reading functional so that speed, comprehension, and enjoyment may all be results of a good reading program.

THE ROLE OF NUTRITION IN DISCRIMINATIVE BEHAVIOR

By Essie L. Elliott, M.A.

Director of Home Economics, California Fruit Growers Exchange
Los Angeles

This topic is an assignment to the speaker by Dr. Peter Spencer as a result of discussions relative to his 1937 summer session symposium at Northwestern University.

In his subtopic No. 12, "Diet and Reading", this statement is made: "The physical well being and development of individuals is dynamically influenced by their diets. The specific effects of particular dietary deficiencies on reading behavior are not readily determined. We may with reason infer that whatever influences the proper functioning of any of the organs or processes used in reading will likewise affect the reading process. At any rate, if we are concerned in reading with the 'whole child,' diet should be included among the problems considered. There is evidence that eye functions are seriously affected by dietary deficiencies. It will be well to look for other types of influence and to determine, if possible, symptomatic indices of dietary deficiencies."

The last sentence provides the keynote for this paper. Before we report the results of research into dietary studies it seems necessary to define discriminative behavior. Behavior, as used in everyday parlance, refers to conduct whether good or bad. If, however, we delve into the thesaurus we find that behavior is classed under:

1. Simple voluntary actions, involving:

activity	or	inactivity
haste	or	slowness
exertion	or	repose
fatigue	or	refreshment

11. Complex voluntary actions, involving

carriage	management
demeanor	transactions
conduct	statesmanship

with familiar antonyms such as:

readiness	and	inertness
proficiency	and	inefficiency
alertness	and	dullness
skillfulness	and	inexpertness

Discriminative is an adjective found in the division relating to intellectual faculties. Synonyms are:

distinctive	discerning
nice	alive to differences in
dioristic	selective

Discriminative behavior might refer, therefore, to all voluntary actions on the part of an individual. Does nutrition have anything to do with intelligent response, with discerning action, with scholastic achievement, with intelligent quotients and all the other factors involved in human accomplishment?

First as to the effect of diet on intelligence or mental capacity, degrees of which are supposed to differentiate one individual from another.

Fritz of Iowa State College assembled the results of research on this subject, to date of 1935, in his report on "The Effect of Diet on Intelligence and Learning." (1) He mentions the popular belief that there is an association between mental capacity and a state of nutrition. Blanton doubts the frequent claim of school physicians that children are feeble minded because of poor food and malnutrition resulting therefrom. (F.7)* Levine contradicts by saying that "Malnutrition spares nothing, for even the emotional and mental life of the individual may suffer." (F.26)

E. V. McCollum of Johns Hopkins is often quoted as follows, "American children cannot subsist upon a diet no better than that of the coolie without increasing the 'incidence of tuberculosis, dulling their mental capacity and warping their personalities'." (F.27)

Experimental evidence, continues Fritz, does not support this belief, i.e., that intelligence is markedly altered by diet. Blanton found no injury to intelligence in Germany after the World War. His report was made, however, in 1919, and A. J. Lorenz, then of Chicago, reports that on his visit to Germany 10 years later he found an appalling number of feeble minded children in orphanages. We have no scientific data at hand to substantiate this circumstantial evidence.

Dowd found that "undernourished children distribute themselves in tests of intelligence similarly to normal children." (F.12) Smith, Rosenberg, Nicholls, and several others concur. (F. 40, 38, 35)

Peters believes that there is a noticeable association of idiocy and rickets and that "both idiots and rachitics show a want of phosphorus and calcium in the bony system." (F.37)

Gesell refutes this. (F. 18)

Balyeat produced evidence to indicate that allergic children have a higher I. Q. than non-allergic. 68% of allergic children ranked in the superior group as compared to 25% of non-allergic. A suggested explanation is that the brain cells of allergics are more irritable and hyperactive. (F. 3, 4)

Tang, Chin, and Tsang found that a vegetarian diet had an unfavorable influence on the learning ability of male rats, and none on females. It would seem that more proof of this is needed. (F. 42)

Maurer and Tsai present one of the few pieces of research which links diet deficiency with the ability to learn. (F. 30, 31, 33) (This was veri-

*F. - Reference to the article by Fritz. Numbers refer to his bibliography.

fied by Bernhardt. F. 6.) Rats fed by mothers completely depleted of Vitamin B, and their post nursing diet also B deficient, were decidedly inferior to normal rats in the learning process. Hoefler and Haruy claim that breast feeding of infants for 4 to 9 months is more favorably associated with intelligence than feeding for a greater or shorter time. "No child artificially fed had an I. Q. as high as 130." (F. 20.)

Fritz questions, "Is a child with a high I. Q. one of the fortunate enough to secure adequate vitamin B. during nursing period?"

Therefore, concludes Fritz, with the possible exception of vitamin B, the evidence is disappointing to those who believe that malnutrition has an effect on intelligence and learning capacity.

Dr. Daniel R. Hodgdon would not agree. He was principal of the Columbus School, New Rochelle, New York, in 1932 when he reported on an eight year study of 2,500 school children over eight years of age. He found that children with low I. Q.'s and badly nourished bodies gained from 4 to 10 points in intelligence rating in 20 weeks when fed a supplementary diet of cod liver oil, orange juice, and milk. (2)

Alice Bradley of Santa Barbara State College has conducted nutrition classes in the city schools as part of teacher training in dietetics. Grades represented were from Kindergarten through Junior High. She makes a startling statement: "Among the 160 pupils each year over a ten year period only one malnourished child (Virginia X) had a superior I. Q. rating." She asks us not to say "problem child", but "a child with a problem". For example, Billy could not read. Troublesome child. Tonsils removed, diet corrected, and he made 3 grades in 6 months. Molly, accused of dullness, could not read at six feet what she should have been able to read at 40 feet.

Miss Bradley found one-third of the pupils of a certain elementary school malnourished--judged by the following symptoms: paleness, lines under the eyes, listlessness, poor muscle tone, projecting shoulder blades, fatigue posture, poor digestion, constipation, many colds, irritable or contrary dispositions, forgetful and inattentive. These pupils were usually placed in retarded groups and too frequently stigmatized as "dumb". (Show her charts.) It is regretted by Miss Bradley that scholastic achievement was not correlated at the same time these data were recorded.

Even though evidence is meager to prove that intelligence and a state of nutrition are closely related there are many other experiments which show that the desire to achieve--the "drive" necessary for accomplishment--is lowered by ill health and fatigue due to malnourishment. We have all had school room or social service examples which come to mind immediately and few will dispute the statement that a healthy baby is less a problem in behavior than a sickly one.

Bryant, in Washington, D.C., observed that of all children 10 years of age in the city schools who were taller, heavier and better developed were nearest the 7th grade level. (There were 10 year olds in all grades from 1st to 7th.) (3)

Blanton, to whom we referred above, although he could prove no impairment in intelligence among victims of malnourishment in Germany after the War, found that the number of children failing to pass their grade was doubled, and that only half as many children were doing superior school work as before the War. (4)

Turner, of Mount Holyoke, compared the physical and mental fitness of 942 graduates in 4 classes. Eighty percent of these students of superior mental rank were in splendid physical condition. (5)

At the University of Missouri a similar comparison reported less illness among high score groups than among low score groups. (6)

Nichols and Raubenheimer of U.S.C. found that an important contributing cause to acceptable scholastic achievement in high school girls was a maximum state of physical well-being. (7)

Let us now use the six food groups--conveniently dubbed by Peters and Bogert "the food sextet" (8)--as a basis for further examples of the role of nutrition in influencing human attitudes and behavior. We are assuming, until contradicted, that we all agree upon the premise: a sound body, free from the handicaps and inertia produced by disease, aids the mind in its will or incentive to do better than a malnourished one.

PROTEINS have as their chief use the building and repair of body tissues. Certain proteins such as those of milk and meat have high biologic value. Others, as those of cereals and legumes, have lower biologic value.

"Insufficient protein in the diet leads to slow growth, lack of resistance to infection--and at times to a 'nutritional edema'." (9)

Lusk believes that there is no reason why people living in a cool climate should not, according to the dictates of appetite, continue to ingest about 100 g. of complete protein daily. (10)

McCollum believes that restricted protein diets lead to disease and early senility. (11)

Qualitative protein deficiency plays an important part in secondary anemia, chlorosis, (most frequent in pubescent girls), and in pernicious anemia.

References 3, 4, 5, 6, 7 are summarized in the Dairy Council Digest, Vol. 2, No. 15, Oct. 1931.

CARBOHYDRATE provides the chief source of heat and energy to the human body. It is the best protein sparer we have. The best form of carbohydrate is in potato, milk, bread, cereals, green vegetables, and fruits. Sugars should provide the lesser proportion of carbohydrates because of their tendency to restrict the quota of other food essentials.

Insufficient carbohydrate creates an improper balance in fat oxidation resulting in acetone acidosis, a condition frequent in otherwise healthy individuals--brought on by unwisely restricted reducing diets and in fasting. Since the first symptoms of acetone acidosis are ill temper and irritability we see a good reason for balancing the dietary in this respect.

FAT is of value chiefly "to bring the fuel value to the required figure, for without it it is necessary to take an amount of carbohydrate which is too bulky for comfort and good digestion."⁽¹²⁾

Some fats carry fat soluble vitamin A.

Intestinal absorption is not satisfactory in the absence of fat. School age children should have from 2 to 4 g. per pound of body weight per day.

Complete absence of fat leads to abnormal skin conditions as does excess of fat.

High fat (ketogenic) diets are used in successful treatment of epilepsy. Dr. Helen Hopkins, a successful pediatrician of Los Angeles, recently reported a 7 year old girl, an epileptic, who had reverted to a mumbling stage or seemingly idiotic stage. A high fat diet put her back in school in 6 weeks.

These three important members of the food sextet should (according to nutritionists) be approximated in the diet according to calories (or fuel value) as follows: Protein, 15 percent; carbohydrate, 50 percent; and fat, 35 percent.

WATER is the most essential of the food groups and second only to oxygen in the role of nutrition. Nature makes such insistent demands for water that we shall skip it and consider the two remaining members of the sextet--minerals and vitamins.

MINERALS AND VITAMINS. Early experiments with some of the most important of the 16 or more minerals necessary in body metabolism, viz. iron, calcium, and phosphorus, were obscured by the discovery of vitamins--those familiar protective substances now rapidly being isolated by chemists and research workers.

We shall omit any attempt to deal with all the body minerals and all the vitamins, important as they are to the completeness of this discussion. Instead we shall return to the expedient of citing places

of significant research which point the way to their part in promoting (or preventing) the optimal health and therefore the optimal accomplishment of the individual.

Vitamin A must have received considerable attention in your discussions of the reading problems since its lack causes the serious eye disease, xerophthalmia. There must be thousands of children in the United States with sub-clinical xerophthalmia--children whose diets are too low in dairy products, egg yolk, cod liver oil, fresh fruits and leafy vegetables.

You are also familiar with the relationship of vitamin A to the ability of the eye to regenerate visual purple. Jones et al. showed 34 percent abnormal readings on tests of 37 children in 1936.⁽¹³⁾ Carotene administration restores a normal condition of adaptation to darkness. This research is causing comment as you know in relation to accidents due to "dusk-blindness". An interesting account of the work of Hardy at the Massachusetts Institute of Technology is given in "Feed Your Eyes" by Dr. Walter H. Eddy in Good Housekeeping⁽¹⁴⁾, and a more recent report by Eddy is found in his latest book, "The Avitaminoses".⁽¹⁵⁾

While speaking of the eye it is well to suggest that all those who attempt to reduce weight be warned against the extreme danger of taking the drug dinitrophenol. Cataracts and death may and do result.⁽¹⁶⁾

Vitamin B. The work of animal experimentation and vitamin B₁ complex by Maurer has been referred to above.

B₁ is the anti-neuritic or anti-beriberi vitamin. It is also considered the appetite vitamin. Morgan and Barry demonstrated the latter and its relation to anorexia in the wheat-germ feeding experiment in Berkeley, and raised the question whether the average child today receives enough of B₁ to produce optimal growth.⁽¹⁷⁾

Lack of B₂ (G) causes pellagra, two symptoms of which are dullness and stupor. This is also known as "PP" the pellagra preventive vitamin. Joseph Goldberger removed pellagra from the contagious to the deficiency disease list and thus proved the relationship between diet and a disease in which various countries claimed losses out of every 100,000 persons as follows:

Italy	2,100	1896-1928
United States	3,900	1922-1933
Six Southern States	29,400	1930
Roumania	12,200	1930-1933

The dietary regimen which prevents pellagra is so simple (lean meat, milk, certain green vegetables, peas, peanut flour, yeast and wheat germ) that figures like these are a serious reflection on economic, social and educational institutions which permit them to continue.

Lack of Vitamin B₂ is also responsible for the development of a certain form of cataract.⁽¹⁹⁾ We are encouraged by results in the possible conquering of another dread eye disease, glaucoma, and glaucoma type of cataract, if the work of Dr. Josephson in New York is further substantiated by clinical experience. Cortin, adrenal glands, salt water seepage from eye blood vessels--all are involved in this experiment.⁽²⁰⁾

The recent recognition of the complexity of the vitamin B factor makes it difficult to touch upon the applicable knowledge just around the nutritional corner. Preventing premature senility, gray hair, and feeding for motor control are possibilities of the immediate future.

Vitamin C. Accounts of a disease similar to scurvy are found as far back as Hippocrates. He refers to "a large number of men in the army who suffered from pains in the legs and gangrene of the gums which was accompanied by a loss of teeth."⁽²¹⁾

In 1178 A.D. the Chinese author of the "Chu Lu" wrote of their use in treating fever cases: "Oranges have the power to remove fever in the region of the chest, regulate digestion, and stop vomiting and coughing. If these are taken as a remedy for a long time their effect will penetrate into the spirit. They will also cause the body to become light and prolong life."⁽²²⁾

Dr. John Colbatch wrote on scurvy in 1699. "I have bin frequently told by som seamen and surgeons, that have had long voyages at sea, especially toward China and the Indies, that of a hundred men in a ship, not two of them but have bin almost eaten up with the Scurvy, their skin squalid and full of Blotches, their gums eaten away, and their teeth ready to drop out, Pains and Aches all over the Bodies, etc. and yet on landing at Cadiz or thereabouts, where is plenty of oranges and lemons, and eating large quantities of these, in one fortnight's time at the farthest, scarce one has fail'd of being perfectly cur'd. This is not a relation of one or two Persons only, but what is generally agreed upon, and allowed by all to be the Truth."⁽²³⁾

Dr Joinville, who accompanied the crusaders under St. Louis on their invasion of Egypt in the middle of the thirteenth century, refers "to the livid spongy condition of the gums which the barber-surgeons had to cut away so the soldiers could chew their food." He also noted the purplish black spots on their legs--which we now know to have been hemorrhages under the skin caused by the fragility of capillaries.⁽²⁴⁾

We all know why the British sailors of the 17th and 18th centuries were called "limies." Though vitamin C can be linked with the romantic past, it is hardly a part of romance today to have a diet deficient in it.

Hanke of Chicago performed an experiment at Mooseheart with 351 children. Normal children with "better than average" diet but with tooth decay and gum troubles were given 2 eight-ounce glasses of orange juice and the juice of a lemon daily for 1 year. The rate of incidence of tooth decay was decreased 50 percent and gum troubles 89 percent. Of equal interest is the fact that these children on a high orange juice diet supplement passed through the measles epidemic with considerably shortened prostration time. (25)

Those of us who live in the most important citrus area in the world will be interested in Mellanby's report on dental caries in Europeans in the League of Nations Quarterly Bulletin for 1935. (26)

The extent of dental caries expressed in percent of individuals with carious teeth in Europe is as follows;

Central Italy	69 percent
Northern Italy	71 "
Milan and Genoa	85 "
Hungary	87 "
England	91 "
Germany	92 "
Finland	95 "

In the United States at large there is a high incidence of dental caries; 85 percent of children having defective teeth. In Pasadena, a health conscious as well as a high citrus consuming community, the percentage is 29.5 percent. (27)

Chaney and Blunt at the University of Chicago in 1925 showed that a marked increase in calcium assimilation and phosphorus retention as well as marked weight gain took place when orange juice was added to the basal diet of growing children. (28)

The work of Rinehart with vitamin C in the resistance to streptococcic invasions associated with rheumatoid arthritis and its accompanying cardiac involvements; (29)

--that of the Rockefeller Institute where vitamin C obtained through oranges and lemons has rendered monkeys immune to poliomyelitis; (30)

--of Carlson and de Savitsch in Chicago with tuberculosis patients showing 50 percent objective signs of improvement on orange juice intake over those having the routine diet; (31)

--of Stevens and Hawley at Rochester, New York, with vitamin C and hemorrhagic conditions; (32)

--of Szent-Gyorgyi's work in Austria with capillary permeability and the vitamin P factor (at present called vitamin P--this letter referring to permeability). (33)

All this research points to the importance given vitamin C by nutrition investigators today. This should be gratifying to the citrus

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All this research points to the importance given vitamin C by nutrition investigators today. This should be gratifying to the citrus

growers since oranges and lemons are among the very best sources of this vitamin. Vitamin C cannot be stored in the body for any length of time. Having the requirements met daily will in time be responsible for the removal of many "sub-clinical scurvy" symptoms such as:

1. Swollen, tender gums and defective teeth
2. Fragile capillaries and anemia
3. Retarded growth, weakness and irritability
4. Tenderness about the joints and muscles
5. Digestive disturbances and anorexia

Vitamin D. Human beings are deeply indebted to those scientists who established the relationship of calcium and phosphorus metabolism to vitamin D. Rickets could be a disease of the past if we as a nation were clever enough to apply the nutritional knowledge now available.

Vitamin E, the normal reproductive or anti-sterility vitamin, is so abundant in nature that there need be little concern about its lack in the diet.

The review given above is an all too brief account of some of the research on the relation of the diet to nutrition. However, it serves as an excuse to call to our attention to the opportunity existing today for teachers to point the way to optimal health in the homes reached by their influence.

Among our friends and neighbors we seldom if ever discover fully developed cases of deficiency diseases, xerophthalmia, beriberi, scurvy, rickets, or pellagra, but to those of us who have an informed layman's knowledge of food principles we do see many examples of sub-clinical deficiencies and malnutrition. These without doubt influence discriminative behavior. Fortunately, we can be valuable to our communities if we are wise enough to combine education with tact and psychological understanding.

This paper should include an adequate discussion of anorexia and fatigue, the former the bane of the pediatrician, both of serious concern to the educator.

Calling attention to a few of the many fine treatises on these topics will serve perhaps to emphasize their importance. You will find an excellent and interesting chapter in the White House Conference reports on Growth and Development of the Child. It is entitled "Psychological Factors in Nutrition." (34)

The article of Frederic W. Schultz in the Journal of the American Medical Association entitled "The Problem of Chronic Anorexia in Childhood" is most helpful. (35)

Leopold Moll offers easily followed advice in his paper, "The Child with Anorexia", in the American Journal of Diseases of Children. (36)

Lucas and Pryor treat of this topic in another issue of the same Journal under the title "Factors Involved in Combating the 'Hunger Strike' in Children." (37)

Stafford of Oakland gave a good summary in California and Western Medicine. The title of the article is "The Child Who Will Not Eat." (38)

Eddy discusses anorexia in his chapter on "The Functions of Vitamin B" in his book, The Avitaminoses. (39)

You who are present today are well aware that there are tremendous handicaps placed upon the child by his family. It is not your fault that pediatricians report as high as 90 percent of the children brought to them are "will-not-eat" victims, all of whom become pupils with problems in our schools. (40)

It is difficult for you to secure the discriminative behavior you desire in your pupils when they are below par physically due to the lack on the parent's part of the psychological knowledge of child feeding. Our Home Economics departments in which child psychology and child diet are included in the same unit should help to make this a less serious condition in the homes of the future.

Briefly, then, to choose highlights from all the references given above, malnutrition due to anorexia or loss of appetite is so frequent as to provide the major worry of parents and pediatricians. There is a minimum amount of anorexia in orphan asylums! (41)

Anorexia seldom exists in an environment free from the unfavorable factors found in the home. These factors are:

Incorrect food preparation.

Meals with the family at too early an age or not with the family at the correct age.

Irregularity of meals.

Spoon feeding by the parent after the month when the child desires to feed himself.

Impatience by parents.

Interference by relatives.

Over concern on the part of parents about weight and height, calories and other food values.

The natural trait of the child to glory in attention, no matter what the cost.

Excitement, fatigue just before meals.

Stimulation of numbers, cajoling, bribing, threatening.

Do these not point the way to a renewal of efforts to place before parents the fundamentals of child feeding and guidance?

Finally an expanded mention of the role of fatigue in malnutrition with its consequent effect upon behavior is in order. The writer was especially interested in the statements and experiments of the following

authorities:

Scott in "Appetizers in Child Nutrition", says: "In the larger cities of this and of other countries, malnutrition can often be traced directly to the evils of herding, faulty hygiene, to the improper selection and preparation of foods, etc., but indirectly to lack of relaxation and to shortened rest periods. Many children in these communities expend more energy during the day than they have stored up during the previous night, or that can again be restored by the amount and kind of food which they eat or by the too short hours in which they sleep in the succeeding day and night. In consequence, anyone curious enough may see their fruits in underweight and in undernourishment all around him. Even if taught the necessity of rest and of relaxation, the yoke of poverty often grants these children no facilities with which to carry out prescribed teachings. The cost of recreation, of rest, of relaxation in our finely sensitized populace is often unlearned.

"It is obvious that the treatment of all conditions heretofore enumerated has been sensed between the lines of these pages, namely, that the health and development of children are to a large extent dominated by hunger, thirst and fatigue."(42)

Professor Mouriquand, Professor of Pediatrics at the University of Lyons, France, described to A. J. Lorenz his experiment which showed that endurance is directly related to vitamin C--by feeding one dog orange juice before putting him to collapse exercise on a treadmill, and at another time no orange juice but only sugar water. He said that the orange juice prepared dog outlasted the non-orange juice dog by more than an hour. Also, that on autopsy the suprarenal glands of the fatigued dogs showed a difference--the one without orange juice being devoid of cholesterol, the other normal.(43)

Laird and others performed an interesting experiment to determine the "Dietary cause and possible elimination of afternoon sluggishness." "The experiments showed conclusively that early afternoon sluggishness is due to a marked degree to brain anemia, caused by an unwisely chosen heavy noon meal, rather than to the necessity of 'warming-up' which has frequently been offered as the explanation for the early afternoon low production. On half of the 24 days the subjects ate a 'dairy lunch', on the other 12 days they ate a fairly heavy noon meal. Tests of mental work and functions of the first hour of the afternoon showed that the lessened cerebral anemia following the light lunch was accompanied by an increase of approximately 6 percent in mental speed and an increase of 25 percent in mental accuracy. Lapses in attention were nearly 70 percent fewer after the light lunch than after the heavier meal. It is concluded that a wise selection of light foods for the noon meal can contribute materially toward offsetting lowered mental efficiency during the early afternoon and the consequent low production of mental workers during this part of the work period."(44)

Giddings of Atlanta concludes that children's sleep is influenced by the type of evening meal and that boys and girls have definite individual sleep patterns.(45)

The relationship to sleep, fatigue, and incentive to work, or to do are too familiar for further comment.

Lamont in "Fatigue in Children" calls our attention to morbid fatigue due to upper respiratory infections. His conclusions are drawn from the study of about 125,000 children seen in institutions and private practice.(46)

Wiggam offers "Five Meals A Day" as a solution to fatigue. Not more food, but oftener is his contention. "As a net result of these epoch-making experiments, the following dietary schedule is suggested:

"Don't depend on your stomach to tell you when you are hungry. It may tell you and may not.

"Don't fast in order to give your stomach a rest. It usually works harder when empty than when moderately full. The treatment for stomach trouble is frequent light meals.

"Every three or four hours eat.

"Unless you are reducing on a canary-bird diet, don't add the food for your extra meal to your regular meals; subtract it from them.

"When you are tired, fatigued, blue, too tired to eat--eat.

"Between-Meal Combinations:

"Affording the amount of carbohydrate necessary to produce a fair increase in efficiency, and yet not supply more than 200 calories. The greatest objection to extra meals is the possibility of gain in weight. Actually, they prevent the ravenous hunger at regular meals that leads to overeating and overweight.

"Milk: Although supplying protein and some minerals, does not contain enough carbohydrate to render one glass effective. Two glasses are required.

"Milk and one banana: An ideal combination.

"Three large glasses of orange juice: Low in carbohydrate and contains no roughage or appreciable amounts of protein."(47)

In this paper the writer has referred you to several pieces of research recognized as valid by scientists today. However, Mr. B. A. Nicol, now working on his doctorate at U.S.C., on techniques used in research, issues this warning in the interpretation of all statistics: "The technique to determine statistical reliability of the observed differences between groups of data is more important than their correlation."(48)

It seems incontrovertible, however, that, regardless of possible errors in statistical evaluation, research has pointed the need for and possibility of optimal, rather than average or sub-clinical, health for a far greater number of our population than at present. Levine's figures would validate this assumption. "In 1925 there were at least 4 million school children suffering directly from malnutrition."(49)

SUMMARY

There is insufficient evidence that mental capacity is influenced by the state of bodily nutrition.

The work of Mauer and Tsai indicated that the learning process is affected in rats depleted of vitamin B.

"On the other hand", as Fritz said in commenting on this and similar research studies, "we cannot say that malnutrition occurs without any psychological effects, for the technique may have been inadequate It is also important to note that even though intelligence may not be fundamentally altered, should the desire to achieve be lowered through lassitude and ill health, we certainly have sufficient argument for giving some attention to the question of nutrition. . . . Certainly, capacity as achievement is important from a pedagogical standpoint."(50) A distinction between them has not always been made.

Statistics tell us that from 25 percent to 33 1/3 percent of the children in the United States give evidence of less than optimal conditions of nutrition.(51)

Cramer thinks that many persons are in a chronic state of vitamin underfeeding and that a lasting influence may be carried over from infancy. If, therefore, there is lowered vitality and energy we have an important cause of national inefficiency.(52)

Anorexia and fatigue keep thousands of otherwise healthy children in a state of less than optimal efficiency.

There is an urgent necessity for all educators and parents to become thoroughly familiar with the fundamental facts of diet and their relation to optimal health.

They must, at the same time, be intelligently aware of the link between physical and psychological well being since these cannot be divorced in the human animal. This last fact helps to explain why we have so few experiments which record mental or scholastic achievement along with nutritional status. A challenge is therefore offered to educational and nutritional research workers for better correlation hereafter (if ways to eliminate the many disturbing human elements can be found).

"The accumulation of a vast amount of new knowledge concerning an adequate diet has placed the emphasis on the physical to the exclusion of the psychological aspects of nutrition. Much of this knowledge has been gained in the experimental laboratory and has been most actively

disseminated by those who know little or nothing of the psychology of children. So many new ideas for careful thought have been given us in so short a space of time, that there is much mental indigestion both lay and professional. If only the child were a hopper into which the proper ingredients could be poured, to be mechanically ground into an optimal predetermined result, the problem would be simple and very satisfactory. As it is, the child has a peculiar complex little psychology of his own with many strange little quirks and twists that must be duly heeded or it will nullify much that we have gained by this increasing knowledge of food values. Above all, we must bear in mind that he has an individuality of his own which is different entirely from the individuality of adults. There is something biologically primitive about him that can not be rapidly transformed into the more stereotyped requirements of conventional society of adults and particularly of a social order that is now moving so swiftly that even the adult is floundering in his efforts to keep pace with it."(53)

BIBLIOGRAPHY

1. Fritz, Martin F. "The effect of diet on intelligence and learning." *Psychological Bulletin*. 52:355-363. 1935.

**("F" refers to references used by Fritz.)

F7 - Blanton	F3 and F4 - Balyeat
F26 - Levine	F42 - Tang, Chin, and Tsang
F27 - McCollum	F6 - Bernhardt
F12 - Dowd	F20 - Hoefer and Hardy
F40 - Smith	
F38 - Rosenberg	
F35 - Nicholls	
F37 - Peters	
F18 - Gesell	
F30, F31, F33 - Maurer and Tsai. ("Vitamin B. deficiency in nursing young rats and the learning ability.") <i>Biol. So. NS.</i> 70:456-8. November 8, 1929.	

2. Hodgdon, Dr. Daniel R. "Salvaging the educated." *New Jersey Journal of Education*. March, 1929. P. 4-10.
3. Holt, L. Emmett (M.D., LL.D.) *Food, health and growth*. New York, The Macmillan Company. 1922. Chapter 1, p. 25.
- 4.//Blanton. "Mental and nervous changes in children--caused by under-nutrition." *Mental Hygiene*, III. July, 1919.
- 5.//Ryan. "High intelligence, long life, physical fitness, all related." *Hygeia Magazine*. September, 1931, Vol. 9, No. 9.
- 6.//Stearn, and Mitchell. "Health of the college women." *American Journal of Public Health*, September, 1931, Vol. XXI, No. 9.
- 7.//Nichols, Marjorie, and Raubenheimer. "Relationship between improvement in health and improvement in scholarship." *The Journal of Juvenile Research*. April, 1930. Vol. XIV. No. 2. P. 114-119.
8. Bogert, Dr. L. Jean, *Nutrition and physical fitness*. Philadelphia. W. B. Saunders Co. 2nd edition. 1935. P. 18.
9. McLester, James S. (M.D.) *Nutrition and diet in health and disease*. Philadelphia. W.B. Saunders Co. 1928. Chap. IX. P. 238.
10. Lusk, G. *The science of nutrition*. Edition 3. P. 339.
11. McCollum, E. V. *The newer knowledge of nutrition*. P. 54.
12. McLester, James S. P. 225.
13. Jones, P. C., Blanchard, Evelyn, and Zantmire, Zelma. "Dark adaptation and vitamin A." *Journal of the American Medical Association*. Vol. 108, No. 6. February 6, 1937. P. 451-458.
14. Eddy, Dr. Walter H. "Feed your eyes." *The Good Housekeeping*. March, 1936. P. 126.
15. Eddy, Walter H. (Ph.D.) and Dalldorf, Gilbert (M.D.) *The avitaminoses*. Baltimore. The Williams and Wilkins Co. 1937. P. 38-55.
16. Several articles have appeared in 1936 and 1937 in the *Journal of the American Medical Association*, published in Chicago.

** refers to reference by Fritz in *Psychological Bulletin* 32:355-363. 1935.
 // References from *Dairy Council Digests*. Vol. 2, No. 15. October, 1931.

17. Morgan, Agnes Fay, and Hunt, Marion J. "The vitamin B (B₁) and G (B₂) content of wheat products." *Cereal Chemistry*. Vol. XII, No. 4, July 1935.
18. Quarterly Bulletin of the League of Nations Health Organization. Vol. IV, No. 2. June, 1935. P. 428.
19. Langston, William C. (M.D.) and Day, Paul L. (Ph.D.) "Nutritional cataract in the Norway rat (*Mus Norvegicus*)". *Southern Medical Journal*. February, 1933. P. 128-129.
20. Josephson, Dr. (Reported from Science). *Time*, July 29, 1935.
21. Hippocrates. In an old book.
22. Chu Lu. From an old translation.
23. Colbatch. From an original copy.
24. De Joinville. From an original account of the crusades.
25. Hanke, Dr. Milton T. Diet and dental health. The University of Chicago Press. 1933. P. 235.
26. Quarterly Bulletin of the League of Nations Health Organization. Vol. IV, No. 2. June, 1935. P. 426.
27. Halverson, Wilton L. (M.D.) Pasadena Health Officer's Report of Pasadena Health Activities for 1935. P. 55 and 60.
28. Chaney, Margaret S., and Blunt, Katharine. "The effect of orange juice on the calcium, phosphorus, magnesium, and nitrogen retention and urinary organic acids of growing children." *Journal of Biological Chemistry*. Vol. LXVI, No. 21, December, 1925. P. 843.
29. Rinehart, James F. (M.D.) "Vitamin C and rheumatic fever". Reprinted from *International Clinics*, Vol. 22, series 47. 1937. J. B. Lippincott Co. P. 36.
30. Jungeblut, Dr. Claus W. Report of therapeutic powers of vitamin C in experimental poliomyelitis to the Society of American Bacteriologists in New York, January, 1936. Reported in "News Week", January 4, 1936.
31. Carlson and de Savitsch. Correspondence concerning unpublished research between the California Fruit Growers Exchange and Carlson and de Savitsch of the University of Chicago.
32. Hawley, Estelle E., Stephens, D. J., and Anderson, George. "The excretion of vitamin C in normal individuals following a comparable quantitative administration in the form of orange juice, cevitamic acid by mouth and cevitamic acid intravenously." *The Journal of Nutrition*. Vol. 11, No. 2. February, 1936.
33. Szent-Gyorgi, and associates. (The avitaminoses. Eddy, Walter H. [Ph.D.] and Dalldorf, Gilbert, [M.D.] Baltimore. The Williams and Wilkins Company. 1937. P. 200.)
34. The White House Conference on Child Health and Protection. Growth and development of the child. Part III. New York. The Century Co. 1932. P. 512-519.
35. Schultz, Frederic W. (M.D.) "The problem of chronic anorexia in childhood." *The Journal of the American Medical Association*. 94: January 11, 1930. P. 73-78.
36. Moll, Leopold. "The child with anorexia." *American Journal of diseases of children*. Vol. 42. July, 1931. P. 145-146.
37. Lucas, William Palmer, (M.D.), and Pryor, Helen Brenton, (M.D.). "Factors involved in combating the 'Hunger strike' in children." *American Journal of the Diseases of Children*. Vol. 41. February, 1931. P. 249-261.

38. Stafford, Henry E. (M.D.) "The Child who will not eat." California and Western Medicine. Vol. XXXII, No. 1. January, 1930. P. 18-19.
39. Eddy, Walter H. (Ph.D.), and Dalldorf, Gilbert (M.D.) The avitaminoses. Baltimore. The Williams and Wilkins Co. 1937. P. 79-85.
40. The White House Conference on Child Health and Protection. Growth and development of the child. Part III. New York. The Century Co. 1932. P. 512.
41. Ibid. P. 515.
42. Scott. "Appetizers in child nutrition." Medical Journal and Record. December 21, 1932. P. 498.
43. Personal interview of A. J. Lorenz and Professor Mouriquand, from the University of Lyons, France.
44. Laird, Donald A., Deland, Durgin; Drexel, Hilda; and Riemer, Karl. "A study of dietary cause and possible elimination of early afternoon sluggishness." Psychological Laboratory, Hamilton, New York. American Dietetic Journal. January, 1936.
45. Giddings, Glenville (M.D.) "Child's sleep--effect of certain foods and beverages on sleep motility." American Journal of Public Health. Vol. 24. June, 1934. P. 609-614.
46. Lamont, F. A. "Fatigue in children." (Condensed from the Canadian Medical Association Journal, 36:47, 1937.) (Conclusions are drawn from the study of about 125,000 children seen in institutions and private practice.) Current Medical Digest. April, 1937. P. 13.
47. Wiggam, Albert Edward. "Five meals a day." Review of reviews. June, 1936. P. 30-32.
48. Personal interview with B. A. Nicol. July 17, 1937.
49. F. 25.
50. Fritz, Martin F. "The effect of diet on intelligence and learning." Psychological Bulletin 32:36. 1935.
51. F. 8.
52. F. 9 and 10.
53. The White House Conference on Child Health and Protection. Growth and development of the child. Part III. New York. The Century Co. 1932. P. 519.

VISUAL DEFECTS AS FACTORS INFLUENCING
ACHIEVEMENT IN READING

Lucian P. Farris, Principal
Oakland (Calif.) High School

The purpose of this study was to determine whether or not visual defects influence the achievement in reading of school children of the seventh grade in the Oakland Public Schools. In particular, answers have been sought to the following questions: (1) Do different types of eye defects when studied separately affect achievement in reading? (2) Do eye defects when considered collectively influence achievement in reading? (3) Are defective eyes when optically corrected more or less proficient than defective eyes not provided with lenses as evidenced through achievement in reading? (4) Are defective eyes when optically corrected generally more or less proficient than normal eyes as evidenced through achievement in reading?

The procedure in the collection of data involved the giving of intelligence tests, the administration of tests for visual efficiency and the giving of achievement tests in reading at the beginning and the end of the study. The Kuhlman-Anderson Intelligence Test and the Stanford Achievement Test in Reading were given late in October 1930 to approximately 1900 H-6 grade pupils. From these tests, summaries of which were on file at the Department of Research, Oakland Public Schools, the chronological age, intelligence quotients and reading scores were obtained for use later in the study. In January and February, 1931, under the immediate direction of the Division of Optometry, University of California, visual efficiency tests including tests for the efficiency of the functions of accommodation and convergence were given to 1685 pupils of the L-7 grade in the 16 public junior high schools of Oakland.

For many years school procedures have been based upon the assumption that vision is free from impediments if, and when, in perceiving distant objects, the acuity equals or approximates the value generally accepted as normal. The adoption of a standard on the assumption that the rating in visual acuity is a measure of the ease with which the eyes perform their visual functions is to accept a standard which places major emphasis upon retinal activity and to a great extent ignores the muscular functions of the eye which are known to lie at the basis of the numerous discomforts which frequently affect the eyes in vision. Accommodation of the eyes, and the convergence of their visual axes are functions essential to the acts of vision and require in most phases of their activity definite contractions of muscle groups. The visual acts of reading are impossible without the coordination of these muscularly controlled functions, and the conditions of comfort which attend the reading process definitely depend upon the degree of perfection with which they act. For this reason, in this study, tests were given and data obtained indicating the efficiency of the functions of accommodation and convergence in addition to those tests which primarily disclose the nature of the focusing of the eyes.

The study is delimited to a consideration of visual efficiency as it affects achievement in reading for a period of one year by the pupils in the seventh grade in the Oakland Public Schools. (To be exact, 14 months, October 1930 to December 1931.) The procedure was further delimited and refined by selecting pupils for the control group whose chronological age and mental ability were approximately equivalent to those of the defective group.

The method was that of comparing statistically the achievement in reading of seventh grade pupils, equal in ability and chronological age, but different in visual acuity. The study was conducted under reasonably well controlled conditions; this statement is borne out by the fact that the difference in average chronological age between the normal and defective groups never exceeds six months, usually one or two months, and the difference in average intelligence quotients is more than two in but one instance; moreover the average chronological age for the entire 384 pupils of the control group was identical to that of the 384 in the defective group; also, there was only 0.2 of one unit difference in average I.Q.'s of the groups. Furthermore, any inequalities which might be expected from the teacher factor were presumably ironed out since there were 95 different teachers teaching the 768 pupils, 46 while the pupils were in the L-7 grade and 49 different teachers in the H-7 grade. For instance, there was an average of less than three pupils per teacher for each type of eye defect involved in the study.

The major findings of this study are:

Forty-four per cent, i.e. 739 of the 1685 pupils in this study who were given the visual tests were found to have eye defects of varying degrees. For purposes of comparison the White House Conference Reports on Child Health and Protection estimate that approximately 19 per cent of the school population have eye defects which can be remedied so that the children so affected may be brought within the normal group for educational purposes; the Oakdale Survey shows that 63 per cent were affected with some degree of refractive error; Berkowitz reports that estimates approximate 42 per cent of school children as having eye defects; Hilleboe's study gives 12 per cent as serious enough to be classed as health defects.

Both hyperopia and strabismus are associated with less than normal progress in reading; while myopia and myopic astigmatism were both found to be associated with more than normal progress. The hypothesis that greater strain on the nervous system is required to adjust hyperopic eyes to the conditions which must be satisfied in reading seems confirmed by the finding of this study that pupils with normal eyes have 97 chances in 100 to make greater gains in reading than do pupils affected with varying degrees of hyperopia. (Critical ratio 2.67, 78 cases studied.) Also the less generally accepted hypothesis that myopic eyes adjust themselves to reading with less exertion of the muscles of accommodation and less expenditure of nerve energy than do emmetropic eyes was rendered more tenable by this study. It was found that for the 136 pupils affected with myopia and myopic astigmatism there are 96 chances in 100 that the true difference in favor of the defectives is greater than zero. (Critical ratio -2.57.)

Pupils whose visual perception is monocular make progress in reading superior to those not having correct coordination of the two eyes.

Types of eye defects other than the myopic, hyperopic, and the strabismic types have little effect upon progress in reading. In other words, the data of this study do not bear out the hypothesis that children with defects in visual acuity are always handicapped with respect to the learning of reading. The fact that achievement in reading is often affected by muscular eye functions is believed to account for the progress in reading achievement frequently found among those pupils of this study with a low visual acuity rating, and argues in favor of the adoption of a more comprehensive standard than the visual acuity rating in appraising the efficiency of the visual functions.

When all types of eye defects were considered collectively the defectives made slightly greater gains than the normals (critical ratio -1.10). It is possible, however, that extreme cases among the one hundred thirty-six who were affected with myopia and myopic astigmatism are largely accountable for the results.

Correction lenses, in cases involving types of eye defects found to be associated with poor reading (both hyperopia and strabismus) are aids to achievement. For example, hyperopes wearing correction lenses made an average individual gain in reading score of 7.0 while an equal number of hyperopes not wearing lenses made an average of individual gains of only 5.5; for strabismus 11.2 for those with lenses against 7.3 for those without lenses. Those groups of pupils affected with myopia, myopic astigmatism, monocular visual perception, and ocular muscle imbalance, despite their lack of lenses, made a greater average of individual gains in reading score than did those defectives having the same refractive errors but wearing lenses. The myopes, for example, who were wearing lenses made an average individual gain in reading score of 7.3 while those not wearing lenses made an average gain of 9.0; for myopic astigmatism 9.1 for those with lenses against 9.6 made for those without lenses. Therefore since the myopic groups without lenses made progress superior to equivalent groups having the same errors and wearing lenses, the findings indirectly confirm one of the major conclusions of this investigation; namely, that the generally accepted standard of eye structure (emmetropia) does not necessarily imply superiority of efficiency in reading. In other words, the same treatment that causes eyes to function more nearly as emmetropic eyes, such as the placing of lenses on pupils affected with myopia was not found to significantly improve their reading efficiency.

Certain important educational implications may be drawn from this study:

The superficial eye tests (with the Snellen Charts alone) which are at present being given in many of our public schools are inadequate and should be replaced by more thorough and more complete visual tests.

The establishment and maintenance of eye clinics as a part of the health program in the public schools would enable many pupils to take better advantage of the educational program. In these clinics the aim should be to determine conditions which indicate unfavorable functioning of the eyes in so far as they pertain to school work, and to institute measures to remove such impediments to school progress. In some cases it might mean the constant use of lenses to correct refractive errors; in other cases it might necessitate lenses which have the effect of better coordinating the visual functions of accommodation and convergence while in still other cases it might merely involve exercises for the purpose of stimulating the desired response of the eyes in vision.

There is a need for closer coordination among school counselors, school nurses and school doctors. School counselors should be required to secure specific knowledge regarding the character of a student's visual conditions since such information is as much a working tool for better educational and vocational guidance as is a knowledge of his I.Q., chronological age, reading age, and such other factors as are at present used by school counselors in their guidance programs.

Class room methods and procedures in teaching reading should be modified to meet the special needs of those pupils who have eye defects. Hyperopes might well be seated in the rear of the class room, whereas, if myopes must be in the same class room, they should be in the seats quite near the blackboard. The teacher should make certain that script writing on the front blackboard is large enough to be easily read by pupils in the back rows. The findings further suggest to those engaged in the administration of our schools the need of providing more suitable reading materials for those whose visual acuity is low; also, for those having defective eye structure even though their acuity of vision in reading may be equal or superior to those having emmetropic eyes. Books in large type, typewriters with large type, heavy lead pencils, maps without detail and other instructional material that may be used without causing eye fatigue should be provided as a part of a school system's remedial program.

ECONOMY AND CARRY-OVER IN THE TEACHING OF READING

Harold M. Field,

Hubert Howe Bancroft Junior High School, Hollywood, Calif.

The first consideration in remedial devices for the teaching of reading is an economical one. There must be no wasted effort. Remedial work should be so planned that it can do the greatest good to the greatest number in the shortest time with the least effort on the part of both teacher and pupil.

In the large school there are too many remedial cases to hope to consign them all to a special class. Some type of remedial work should be carried on in every department, in every class. It is uneconomical and impractical to put always the burden upon the English teacher or the Social Studies teacher. Under such a set-up the pupil forms the impression that accurate reading is a concern only in those two subjects. In all others he may slight. And, if those two subjects happen to be ones which he is not enthusiastic about, you can see that the impelling force is killed at once, whereas it is possible to improve his accomplishment rather by extending his enthusiasm fan-like to other subjects. This would greatly simplify the matter of a discovered interest to tie to, for every teacher is, so to speak, an authority within his own department.

Dr. Kirkpatrick has said, "Train the child to face the future by helping him to live the present."

It is such saws that have provided the impetus to cast off the old superstitions of the deadly classics for good, bad, and indifferent, and all the soul-killing analysis that went with them.

Every academic subject has its own particular grist for the future. These are the so-called fundamentals. Furthermore, in the matter of remedial measures, there is a very definite need of devices in specific fields,--history, science, mathematics. There is no department that does not have its complaint of reading deficiency.

Now the greatest bulk comprising our remedial groups is below average in intelligence. We must base our procedures upon their meager abilities, meager interests, and the prognosis, particularly the prognosis. We don't need an exhaustive survey to know what their reading fare is going to be. Quite regardless of their I.Q., they are, as far as the world is concerned, Mr. and Mrs. Average Man. In performance of every-day living they are going to be called upon to read pretty much the same stuff as you and I: certain portions of the daily newspaper, application forms for licenses, application forms for jobs, ballots, theatre programs, instructions for doing this and that, checks, deposit slips, notes, deeds, mortgages, income tax reports, if they're fortunate enough to have any income. And these requirements are most advantageously distributed among their various academic classes.

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Dr. Kirkpatrick has said, "Train the child to face the future by helping him to live the present."

It is such saws that have provided the impetus to cast off the old superstitions of the deadly classics for good, bad, and indifferent, and all the soul-killing analysis that went with them.

Every academic subject has its own particular grist for the future. These are the so-called fundamentals. Furthermore, in the matter of remedial measures, there is a very definite need of devices in specific fields,--history, science, mathematics. There is no department that does not have its complaint of reading deficiency.

Now the greatest bulk comprising our remedial groups is below average in intelligence. We must base our procedures upon their meager abilities, meager interests, and the prognosis, particularly the prognosis. We don't need an exhaustive survey to know what their reading fare is going to be. Quite regardless of their I.Q., they are, as far as the world is concerned, Mr. and Mrs. Average Man. In performance of every-day living they are going to be called upon to read pretty much the same stuff as you and I: certain portions of the daily newspaper, application forms for licenses, application forms for jobs, ballots, theatre programs, instructions for doing this and that, checks, deposit slips, notes, deeds, mortgages, income tax reports, if they're fortunate enough to have any income. And these requirements are most advantageously distributed among their various academic classes.

We have become resigned to the hopelessness of making a silk purse out of a sow's ear. We have even become so courageous as to let boys and girls know that their ability is, at best, only average and, possibly, below; that they're equipped to do routine work, but nothing that requires independent thinking. And everybody is happy as a result. There are fewer nervous breakdowns, fewer commitments to our insane asylums of toads trying to be as big as oxen, and boys and girls trying desperately to fulfill the expectations of a too-ambitious parent or an over-zealous school teacher.

The child must know where he is and where he should be; he must know his weaknesses and how to set about overcoming them.

Is the ability to locate information so important for this group? They are distinctly not of the inquiring mind. After the usual preliminary drill in alphabetical arrangement, there will be more vital demands upon them than the reference book and the card catalogue. Life for them just isn't made up of these things. Closer to their lives are: telephone books, city directories, time tables, classified sections of newspapers, laundry lists, Sears-Roebuck catalogues, advertising booklets, travel brochures, city maps, automobile maps, ad infinitum. Such things are going to comprise their non-fictional reading.

As for their fictional reading, something light and airy. And you have no idea how light and airy until you have asked for a sampling. Then and only then can you know just how light light reading can be. Nothing of either type that makes any demand upon the thought process. Why?

In the first place, thought is a painful process. If you don't think so, sit down and think of your income tax for a while, sit down and think of that appointment you have with your dentist next week, or sit down and think of the fact that you had to stay home this summer because you didn't have money enough to get out of the state.

In the second place, boys and girls in these remedial groups don't have much of anything to think with. Do you know what you are asking when you ask them to think? You're asking them to perform a complicated process which only the higher mentality is capable of performing.

What is thought? You have had oodles of psychology and so have I, but I don't believe I ever sat down and asked myself, "What is thought?", at least not until just recently. I know Aristotle probably had an answer for it. He had an answer for most everything, but I don't recall just now what it was. To me thought is taking something of your own, adding it to something you have before you, to make something else. I doubt that you can teach someone to think any more than you can teach someone to be a story writer. You're either a story writer or you're not a story writer, and no amount of instruction is going to make you one, at

any rate not a good one. You're either a thinker, or you're not a thinker, and there's not much to be done about it.

Now recollection is not thought. Recollection is entirely within the capabilities of these pupils. You can call the process thought if you want to, but it still remains recollection, a thought GETTING process, memory, facts.

I can't see that organization means very much. What does it matter whether a horse is talked about first in a paragraph or a cat, so long as there remains a sufficient factual residue.

To the slow-moving readers the past is a darkness, the future doesn't exist. The only reality for them is the fleeting vision that is passing immediately through their minds. Reading for them is a soporific that lives only for the moment. They bring nothing to it, and they take nothing away. And that is exactly as it should be--for them. They are not the ones who are going to give us our thoughts. As far as the thought process is concerned they are silent partners; they're on the receiving end. Why divorce reading from all the other life processes of these deficient people?

The members of your reading groups are enrolled because certain tests indicate inability. But most of them you will find are able to read, and read pretty well. The deficiency is one of thought-getting as indicated by standard tests which evaluate, by the way, recollection rather than thought.

I had this clearly illustrated with a segregated group of readers this past year. I was interested to know if their inability to read had been responsible for their low I.Q. rating as indicated by intelligence tests, or whether there was, as well, a native deficiency to "think". I found the latter to be the case. Though they had made marked improvement in word recognition, an intelligence test at the end of the year showed an advance of only a few points, which is a logical expectation in any event.

The vital things are to be able to read, to understand what is read, to recall, and to carry out simple instructions. I see these as the four pillars of wisdom of reading instruction. Anything else is excess baggage, just so much wasted sweetness on the desert air.

The best possible device has as its point of departure the viewpoint of the child. If our clientele is nothing else, it is inextinguishably human. They practice few inhibitions. We envy their complete lack of self-consciousness. Theirs is the way of least resistance. It is all the charm of the eye, the delight of the sense. The dull tones of the book stall might entice you and me; we don't judge people by their clothes. But we can understand the appeal of the magazine stand with its gayety, its freshness, its garish covers. It was with this idea in mind that I devised magazine stories.

It was necessary first of all to know what the group interests were. A little survey within my own school disclosed their interests as quite general, and what might be described as, on the whole, mature: mystery, adventure, western, sport, animal, and travel stories ranked highest,--what is termed the literature of action. It is not enough, however, to know mere reading interests. You are too circumscribed. For the most part low groups are non-readers. A survey of their hobbies revealed an essential agreement, but a much wider range of interests for utilization. This introduces a problem which faces workers with remedial groups.

While poorly equipped, they are not intrigued by the average fare on our library shelves which is within their grasp. "The Sun Bonnet Babies in Holland" holds no glamour for a boy or girl in the teens. Writers of children's stories while aware of the situation seem loathe to accommodate. In the large Junior High School with its modest library there is a heavy drain on popular material. It is soon depleted.

I have gone to considerable pains to assemble a graded reading list of well over a thousand titles. It doesn't function so very successfully right now because of the dullness and elementary quality of the titles. I am sure it will when it has become sufficiently democratic. It is well for the first six or eight weeks that a class stick rather rigidly to some such list. They may read at their own level or below, but not much above. This will correct for a time that discouragement which they have felt in attempting books beyond their abilities. When once self confidence has been restored, they may have more freedom.

Within a reasonable range, distinctions between grade levels are too slight to sacrifice to it what is of far more importance in carry over,--a pupil's own volition and judgment. A pupil must **never** decide upon a book until he has first taken it from the shelf, weighed the title, read the introduction, and at least a few pages of the text. And once the book has been checked out, it must be finished, in order to drive home the realization of the extent that poor judgment heretofore has functioned in his reading.

It pays to spend an occasional entire period in painstakingly checking quantitative reading, with a "Why not?", singling out pupils individually for an accounting acts, after several repetitions, as a stimulus, even in stubborn cases of boys whose negativism has had its roots in the questionable notoriety of being "that boy who has never read a book". A little plain good-natured "kidding" or the policy of "leave them alone, and they'll come home, wagging their tails behind them" will accomplish more than trying to attach too much significance, or "carrying on" about the damning consequences and the stigma that attaches to being a non-reader. That sort of thing goes to a stubborn reader's head like wine. He laps it up.

They'll get tired of reporting the same thing every time the matter is brought up, and they'll make an effort to have something else to report just to see the look of astonishment on the faces of their fellow classmen. I had a particularly torrid example of this last term in one George H. George was a guerilla if there ever was one. He had never read a book and, furthermore, never intended to. It was just a silly waste of time. Before the end of the term George had read five books, and good, substantial ones too. You see, George was just a softy at heart. He couldn't take it.

Consciences ought to be more elastic when it comes to book reports. It's hardly necessary to be suspicious minded and demand a strict accounting for every book read. Such an attitude does nothing but dampen enthusiasm and make a frightful bore of the whole thing. Would you have enjoyed "Anethony Adverse" or "Gone with the Wind" if you knew there was a tedious book report hanging over you like the sword of Damocles? Wouldn't you have a dark brown taste in your mouth all along? Some simple, easily-checked card will suffice, something which will include an opportunity for the pupil to react in his own language rather than in some meaningless, superimposed, adult terms.

The magazine stories are removed from the magazine, stitched into durable manila covers, and each equipped with a preliminary paragraph stating clearly the purpose to be carried out in the reading. All stories emphasize thought getting, and each story emphasizes one particular reading skill.

The first three minutes of class reading is timed, and each pupil translates his speed grade equivalent by the Sangren-Woody or some other speed ratio. At the back of the folder is a test which indicates how well the reader has fulfilled the purpose. Each pupil records his score in a notebook chart. For this purpose I had printed a "Progress Chart in Reading" which economizes time of tedious explanation and minimizes the liability of error and messiness on the part of the pupil, not to mention a certain amount of impressiveness and respect which any printed form always imparts.

A further advantage of these selections is their shortness. With a few exceptions the longest can be spanned within one forty-minute class period. Many of them are short enough to permit the reading of two or three, which provides an adaptation to differing material and cuts down the attention span, which is so deplorably short with the retarded reader.

The Buckingham books which have recently appeared and which include the "Masquerade", "Too Many Bears", and "In a Green Valley", offer selections which require more than a single class period of hard and fast reading. On the other hand the McCall-Cook pamphlets offer piecemeal selections, and most of them on too high a literary plane to carry over into life reading. These magazine stories do carry over because they are the stuff that is being read and is going to be read, and in a vocabulary that is simple in difficulty and diversity.

The magazines used are: Collier's, Liberty, Boy's Life, American Boy, Ladies' Home Journal, St. Nicholas, Woman's Home Companion, Pirate Stories, Saturday Evening Post, Ace, Wings, Family Circle, and Los Angeles Times Magazine. To arrange for a little leader there is on the back cover of each booklet a list of books similar in type to the magazine story. There is also a space for initialing, to afford some check of popularity. The front cover is illustrated with a picture, and represents an attempt to compete with the pulp magazines in drawing power. On the days that I permit magazine story reading I display them about the room in such a way that the pupils may make their choice as they might in approaching a magazine stand,--something to intrigue the eye, and stir the pulse!!

In follow-up work based on diagnostic testing which tests word meaning, sentence meaning, central idea, alphabetizing, fact getting, total meaning, rate, and organization, an attempt at individual instruction is likely to result in such a haphazard scattering of effort and nervous energy that nothing is accomplished. There is a tendency to assume that the pupil is being taught, rather than setting about the task directly.

I think I have succeeded in meeting the situation by a set of individual, corrective exercises, typed in duplicate to the number of five or six, stitched into separate covers, numbered consecutively and cumulatively, and placed in a manila envelope. Each exercise is lettered to correspond with a letter on the outside of the envelope, which forestalls confusion in collecting.

As soon as I have a pupil's diagnostic score on file, he is handed one of the envelopes which will provide training in his weakest skill, then his next weakest skill, until all below-grade skills have been covered. When he receives his envelope, he goes off somewhere by himself, and, starting with the first exercise, works straight through. The exercises are so arranged as to provide for constant pupil-teacher conference. At the end of each exercise is the direction, "Show the result to your teacher," or "Talk this over with the instructor". If his work has been satisfactory, he receives an O.K. on his progress chart, and he is allowed to proceed with the next exercise. Every exercise must have an O.K. before an advance one is attempted. This enables me to keep a large class going, to know that there is no wasted effort because each is carrying out work to correct his own individual weakness and not his neighbor's, and that he is not slighting, skipping, or skimming the work. Any printed material which it is impracticable to duplicate is contained for reference in a single envelope labeled, "Master Exercises". One very particular advantage of this form of instruction is that at any time when an effective exercise is worked out, it can be inserted in its proper place, or one not proving satisfactory can be dropped.

I have utilized much the same system in the correction of sound symbols for what might be called the occasional deficiency in work recognition as indicated by Gray's Oral Tests and others. As I have worked out a successful exercise, I have typed it on a 4 x 6 card and

filed it under the proper heading of the confusion it was designed to correct. In drill work the pupil is simply handed a card, and he goes away by himself and works quite independently. Such a system enables me to assist a large group simultaneously.

In the use of flash cards for speed work Dr. Gates seems to think that the benefit of carry-over to the printed page is nil. That may be. I haven't tested it to my satisfaction. But then, we are not always reading pages of print. Just as frequently we are reading short lines in advertisements, on placards, in announcements, print in column formation. But as far as that is concerned, the value of flash cards is greatly enhanced if the cards are arranged to provide a continuity of thought. Jokes are followed with great avidity. They utilize a childish enthusiasm and are particularly fortunate in that they are followed through with eagerness and impatience to get to the point at the end.

In the matter of vocabulary building there is the old standby of looking up words in the dictionary as they are encountered, but as to results I am somewhat pessimistic. There is probably some residue, but I doubt that there is very much with the average group. A dictionary definition is often so cryptic as to leave a total blank in its wake. You've had the experience of chasing from one word to another trying to "tree" a definition. You can imagine the confusion that results in the mind of a Junior High School student. He is essentially visual minded. If you can tie your word to something that he can see, you can drive it home to stay. I have utilized this perceptive sense in a picture vocabulary building. It consists of pictures chosen for their vividness and punch to illustrate the word. The words are chosen with the idea of helping to bring the pupil's vocabulary of recognition up to par in the most economical, enduring, and entertaining fashion. The Thorndyke list has been used as a basis of essentials. When fifty words have been covered, a multiple choice test is given, and then another fifty are started. The real test of word-knowledge assimilation is the ability to apply it to a similar but not identical situation. I have been very much amazed to find that pupils when tested after the lapse of a semester and even a summer remember easily 90 per cent of the words.

There is great fuss and bother about a reading text book. Why, the whole world is our text book! No text book was ever entirely satisfactory. No text book in reading ever could be satisfactory because it could do no more than scratch the surface. Reading is too much a primary means to myriad ends. It is all-inclusive. To be selective is to be contradictory and untrue. All that is read is reading's text book, from the hand bill thrown in at your door on up. And yet we are short-sighted enough to think that its instruction can be undertaken within the limits of a single volume!.

What is reading? Isn't it the conveyance to the mind of an idea through the intermediary of a symbol, printed or otherwise? If so, reading includes pictures. We speak of reading a person's face, his thoughts, his palm, and I suppose we might speak of reading a landscape, a street scene, in other words, reading is a great awareness.

Reading of print demands an interpretative step which retards the process of assimilation, and which the slow moving mind is either unwilling or unable to make if he can get it in a predigested form ready to swallow.

The graphic magazine picture, the moving picture are reading processes predigested. There is an increasing avalanche and popularity of the picture magazine. About 80 per cent of the radio slush is addressed to homo vulgus, and, with its books reviews, dramatizations, news summarizations, et cetera, involves reading processes.

As I see it, such things as these must be tied in with the reading instruction of the future if reading is not to become quaint, obsolete, and at length a lost accomplishment.

THE EYES IN THE ACT OF READING

Dr. J. G. Goodsell, Vice Principal
John H. Francis Polytechnic High School, Los Angeles, Calif.

Introduction

Nila B. Smith, in her book "American Reading Instruction" states, "more innovations have been effected in reading instruction during the first thirty years of the present century than during the entire three hundred years of American history antedating this period." Certainly a wave of interest in the matter of reading ability has swept this country. Not only is this true in the minds of educators but also the general public has evinced great interest as shown by articles in the popular magazines, ("Reader's Digest" for November, 1936) quoted from Today under the title, Touch and Lo, and even "Liberty" tells you how long it should take you to read each story. Due to the tremendous amount of reading material put before us today the efficiency of a reader is certainly a criterion becoming more marked day by day. Even during the World War a serious condition was found among our enlisted men. The National Society for the study of Education reports in the Twenty-Fourth Year Book, "The results of the Army tests led to the conclusion that there must have been over a million of our soldiers and sailors who were not able to write a simple letter or read a newspaper with ease."

Our own professional magazines have been constantly calling our attention to this problem with articles carrying such titles as "Visual Defects"¹, "Extensive Reading"², "Vitalized Reading"³, "Eyes Right!"⁴, "Prevention of Disabilities in Reading"⁵, "Outside Reading Made Easy"⁶, and others too numerous to mention.

Gates and Bend state, "There are probably nearly half a million children the first four grades of American schools whose educational career is blocked by serious disabilities in reading, and that in higher grades a large number of children are unable to read as well as required by the present day curriculum."

Factors Involved in the Reading Process

The list of factors which contribute to producing reading disability is a long one and no attempt will be made to discuss all of these factors. One such list is as follows:

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1. "Visual Defects", Farris, L.P. Sierra Educational News, Sept. 1936.
 2. "Extensive Reading", Stoops, Emery, Sierra Educ. News, Jan. 1937.
 3. "Vitalized Reading", Price, Chas. K., Sierra Educ. News, March 1937.
 4. "Eyes Right!", Goodsell, J.G., Sierra Educ. News, June 1937.
 5. "Prevention of Disabilities in Reading", Gates and Bend, Journal of the N.E.A., Oct. 1936, Nov. 1936, Dec. 1936, Jan. 1937.
 6. "Outside Reading Made Easy", Reynolds, Elizabeth, Journal of the N.E.A., Feb. 1937.

1. Causes due to original nature
 - a. Intelligence
 - b. Eye defects
 - c. Speech defects
 - d. Cerebral dominance
 - e. Auditory defects
 - f. Congenital alexia
 - g. Defective psychological processes
 - h. Constitutional immaturity
2. Causes due to environmental conditions
 - a. Foreign language
 - b. Poor reading environment
 - c. Poor educational opportunities
3. Causes due to poor teaching
 - a. Over-emphasis on oral reading
 - b. Formal methods of teaching
 - c. Poor motivation
 - d. Over-emphasis upon phonetics
 - e. Poor methods of word attack
 - f. Lack of periodic check-ups
4. Accidental causes
 - a. Transfer from one school to another
 - b. Absence
 - c. Illness
 - d. Injury

Dr. Betts in his book "The Prevention and Correction of Reading Difficulties" uses four pages to name the causes of reading difficulties. On page 84, Dr. Betts lists the physical factors and out of twenty such factors thirteen may easily be attributed to the eyes. The speaker is not trying to overemphasize the importance of eye defects, but simply to show their relationship to the whole picture in the reading problem.

Doctors Witty and Kopel of Northwestern University state, "Nevertheless, normal vision is undubitably essential to maximum attainment. Therefore it is highly desirable that each child upon entrance to school and at regular periods thereafter should receive thorough eye-sight study."⁷

I have distributed to you mimeographed sheets, showing the results obtained this spring in testing 424 pupils entering John H. Francis Polytechnic High School. The test used was the standard Haggarty Reading Test. The significant thing about the results shown is that only about 30 per cent of the students have reading grades above their school grade while 60 per cent are below their school grade placement. This means one thing, surely, and that is that the high school is facing a task in either correcting the reading difficulty or adjusting the education problem to the level of these retarded pupils.

7. "Heterophoria and Reading Disability", Witty and Kopel, The Journal of Educational Psychology, March 1936.

The Factors of Vision

In 1862 Professor H. Snellen of Utrecht, Austria, gave to the world the first scientific method of measuring visual acuity or sharpness of vision. Since that time the Snellen Chart, with its varying sized letters has been the standard. Professor Snellen should be given full credit for such an invention and it has undoubtedly been of tremendous value in determining certain types of visual defects. However, for the problem before us today it falls far short of giving full data on the eyes of anyone whose main duty is close work. Unfortunately, the efficiency of the eyes of most school children, the world over, is judged solely upon the ability to read the Snellen Chart. Mr. Farris, Principal of Oakland High School, makes this statement: "The superficial eye-tests which are at present being given in many of our public schools are inadequate and should be replaced by more thorough and more complete visual tests".

The common defects of the human eye are too well known to dwell upon at any great length. However, it may be well to review these quickly and point out their relation to the reading problem.

1. Hyperopia (farsightedness) is by far the most common abnormality. As you may remember, this defect may be considered as the result of an eye-ball which is too short from front (cornea) to back (retina). Light rays which come from great distances and which are therefore parallel may focus on the retina. With an appreciable amount of this defect existant an exertion to produce a change in the human lens or an added convex lens before the eye must be used in order to place the image on the retina. With this type of defect the youngster will read the Snellen Chart very well, frequently reading smaller letters than the normal 20/20 line. He will be passed as O.K. by most school physicians and yet this is the pupil whose eyes are constantly on a strain when looking at any distance inside infinity. The closer the object the greater the strain. It is not difficult to see how nervousness, headaches and even nausea are frequently concomitants of this condition.

Naturally you ask how this defect can be detected. The optometrist detects this defect by two general methods. (1) By the use of convex lenses in which the patient is blurred with the lenses until he cannot read much below the big E on the Snellen Chart and then gradually reducing the power of the lens before the eye until he reads the normal 20/20 letters. The amount of lens power before the eye at this stage of the test is a measure of the hyperopia. This is known as the subjective examination as it is dependent upon the answers given by the patient. (2) Another method which is more scientific and very largely objective is by the use of the retinoscope or skiascope. This instrument is nothing more nor less than a means of shining a light into the eye and observing the movement of the shadow from the light returning through the lens system of the observed eye when the projected light is moved from side to side. Without asking the patient any questions, one who is trained in retinoscopy is able immediately to detect hyperopia (farsightedness), myopia (nearsightedness),

or astigmatism (unequal curvature of the refractive surfaces) and approximately the amount of error. This method does not involve expensive equipment and is not difficult to master. However, it does require a knowledge of lenses and much practice. This method should be used by all who examine the eyes of school children and will undoubtedly come into much more common use as methods are improved.

2. Myopia (nearsightedness) is a condition in which we may consider the eye-ball is too long. Objects near the eyes are usually well in focus upon the retina but objects 20 feet or more away focus in front of the retina and only one thing can be done to remedy the trouble and that is to place a concave lens in front of the eye. This type of youngster is the one who reads poorly on the Snellen Chart. Frequently he is a good student but shuns athletics, particularly games such as baseball, tennis, etc. Distance vision is poor. Myopes should be seated near the front of the school room in order to see the blackboard, maps or drawings placed on the board. He is frequently a good reader as his eyes are easily focused upon the printed page and therefore he has taken most of his relaxation and amusement in that way.

3. Astigmatism (unequal curvature of the refractive surfaces). This type of eye will frequently be able to read the Snellen Chart readily because of the ability to correct a portion of the refractive error by partially closing the eyelids. In this type of defect the numbers on a clock dial are not equally clear. It is a condition in which the lens of the eye frequently contracts and expands in an effort to clear the vision thus putting a strain upon the nervous system and producing headaches. The only remedy for this defect is to place a lens before the eye of unequal curvature that is ground to the proper power in the two principal meridians.

4. Another rather common defect which is of particular importance in the matter of reading is that of the muscular imbalance between the two eyes. It should be thoroughly understood that the two eyes must function together and in perfect harmony or the result will be discomfort or suppression of the vision in one eye. Because a pair of eyes appear straight to an observer does not tell anything of the struggle which may be going on behind the scenes. In fact, the eyes may be working together under the stimulation of the thing looked at while the nerve supply is being taxed beyond all reason.

An easy method of testing the muscular balance between the two eyes when they are looking at a distance is to place a red glass over one eye of the student as he views a distant small source of light and a card over the other. Upon taking away the card the student will see one source of light or two depending upon whether his muscular balance is good or poor. (Demonstrate.) A very important test from the reading standpoint is that of the telebinocular. Dr. Betts refers to this test in his book to which I have already referred. A simple application of this test is possible with an ordinary stereoscope and a card or two. (Demonstrate.) By the judicious use of this equipment the muscular balance at the near point is easily and quickly obtained as well as identification of suppression of one eye.

Surely, eyes which tend to deviate one above the other or outward or inward to a large extent require a very large effort to bring the two images to corresponding parts of the retina for single binocular vision. It should be definitely understood that the human mind will not tolerate double vision. Many other factors of vision should be discussed such as: retinal rivalry, retinal fatigue, peripheral vision, aniseikonia and others too numerous to mention. Also no mention of pathological conditions of the eye is to be considered in this study.

You may rightfully ask, what can be done if any of the above difficulties are found to be the case in a student's eyes? An example or two will be given to answer that question. A short time ago a boy was sent to my office because he was taking mechanical drawing for the third time and failing again. This young man was doing fairly well in other subjects but, try as much as he could, the exactness of the mechanical drawing was beyond his powers. Upon checking up his eyes it was found that he had a vertical muscle imbalance which made it impossible for him to make lines meet where they should meet and we were asking him to do the impossible. A substitution for mechanical drawing was immediately made and he is doing well and his outlook on life is a much happier one. The visual defect is being corrected but the proper balance between the two eyes will not be completed for some time. An error in the visual apparatus which has been in existence for years cannot be corrected in a day.

One more example which is very gratifying is that of a boy who entered Polytechnic High School in February of this year and from the results done in the junior high school and his psychological tests he was placed in a low mental group. The following records tell the story:

At entrance:	I.Q. 71
	Reading 6.5
Eyes checked in March and advised to see eye specialist.	
Obtained glasses early in April.	
Tests in June:	I.Q. 85
	Reading 8.8

Notice the I.Q. has jumped 14 points and the reading grade placement 2.3 years. Of course, we do not believe the actual intelligence of this boy has changed as much as this I.Q. indicates, but the result undoubtedly shows that most of our I.Q. tests are really reading tests and therefore we should be careful that we know the reading ability of a student before we put too much importance on the intelligence index. Dr. Betts says, "It follows that the group intelligence test involving a great number of reading items should not be used as a basis for intelligence or accomplishment quotients. It appears to be a reading test incorrectly labeled."⁸

8. "The Prevention and Correction of Reading Difficulties", Everett A. Betts, Row, Peterson & Co., Evanston, Ill.

You have had given to you a second sheet with some material on it which may illustrate actual eye-sight conditions in a public school of secondary grade. If you will look at the sheet headed "Facsimile of Eye-Sight Survey Record", I would like to call attention to some salient facts. (Comments upon the survey record blank--results of survey and objective methods for teacher's use.)

As has been stated, there are many causes of reading difficulties and it is probably true that not two cases are exactly alike. For this reason it is all the more important that each case, so far as possible, be checked and studied. Dr. Gray of the University of Chicago says, "In the first place, there is need of specific information concerning important types of remedial cases. Detailed descriptions of the characteristics of the various types will help teachers to recognize more quickly and to classify more accurately the pupils under their instruction who encounter difficulties in reading. -----the techniques of diagnosis should be developed in greater detail; it should be refined to the point of accuracy and precision; and it should be simplified sufficiently to enable teachers to make frequent studies of individual cases."⁹ Because of the great need to know actual individual conditions in the reading process the speaker has been very much interested in the reading camera manufactured and put on the market by the American Optical Co.¹⁰ It is a well known fact that the use of photography in any branch of science has been the cause of great strides being made. Usually photography has aided in the change from subjective to objective studies. The subject of reading, now, has made that start.

As all of you may know, the reading process is one in which the eyes jerk across the printed page. At each stop (fixation) the eye takes in several words or part of a word as the case may be. This is known as the span of recognition. The poor reader has the smaller span of recognition and also looks back a word or two or regresses at times. The camera or Ophthalmograph as it is called is so constructed that while the student is reading, a beam of light reflected from the cornea of each eye is made to impinge upon a moving picture film operated by a motor. In this manner, two light tracks are made upon the film, one for each eye. These look like pencil marks made to represent two parallel stairways. Knowing the speed of the film and the number of words read it is an easy matter to find the speed of reading in words per minute. The reading matter supplied for this test is printed upon the proper size card to fit into the instrument and has questions printed upon the back to check the comprehension. Reading matter on the different cards, supplied with the camera, vary according

9. "Remedial Cases in Reading, Their Diagnosis and Treatment", Wm. Scott Gray, University of Chicago.

10. The history and use of this type of instrument is well described in "Controlled Reading", by Earl A. Taylor, University of Chicago Press.

to the reading ability of the student being tested. By a careful study of the film, the following facts can be determined:

- a. Speed of reading in words per minute.
- b. Number of fixations per unit time or per 100 words.
- c. Span of recognition (words or parts of words) per fixation.
- d. Regressions per line or per 100 words.
- e. Lack of binocular coordination or lateral control.
- f. Over-stepping of the ultimate position of fixation.
- g. Other irregularities of eye movements during the reading act.

Along with this equipment, the American Optical Co. has developed what is known as the Metronoscope. An instrument which is "a triple shutter short exposure device, for carrying on controlled reading." "It embodies all the principles underlying in the classroom methods developed in an attempt to control the eye-movements in reading, as well as attempts to broaden the span of recognition by short exposure techniques." "The material is presented in three shutters in such a way that the eye-movements are directed in a rythmical left-to-right movement along the line of print." "This controlled movement of the eye also conditions an accurate return sweep, and as the exposure time is controlled, and the material cannot be re-read, regressions within the line are discouraged."¹¹ (Demonstrate.)

A preliminary test of this equipment was made at John H. Francis Polytechnic High School, Los Angeles, on a small group of pupils enrolled in a 10th grade Remedial Reading class. The test was made near the end of the semester just closed. The results are as follows:

Number completing the test	7
Average number of periods used in working with the Metronoscope	8.33
Average number of minutes per period13
Average change in number of fixations per 100 words.	15.0
Average change in number of regressions per 100 words	- 6.0
Average change in speed of reading in words per minute.	8.5
Average change in span of recognition.07 word
Average change in comprehension.10 per cent

In all fairness to this equipment, it should be noted that all of the above results indicate a change in the right direction in spite of the short time allowed for the experiment. The pupils involved in these tests expressed themselves as interested and several spoke of feeling a definite benefit. Miles Tinker, in an article published in the

11. "The Ophthalm-O-Graph, the Metronoscope; Manual for Controlled Reading". American Optical Co.

"American Journal of Psychology" states, "Inefficient eye-movements and narrow span of apprehension always accompany defective reading habits."

It is planned to carry on a very extensive test of this equipment this fall at John H. Francis Polytechnic High School. As far as possible, all students in the Remedial or Reading Improvement classes will be tested and trained with this apparatus. All who are interested will be welcome to see this experiment in action.

Conclusions

It is the speaker's belief that only a beginning has been made with regard to the whole matter of eye-sight in connection with school work in general and in the reading process in particular. However, some tentative conclusions may be chanced.

- a. There is a very definite need for more thorough and more often check-up of the eyes of school children.
- b. Teachers and students need frequent emphasis placed upon adequate lighting and eye care.
- c. The eyes, in the act of reading, need checking and proper corrective treatment given.
- d. Objective methods checking the action of the eyes while performing the reading act are needed.
- e. When errors in the visual equipment of a child are discovered, he should be referred to the proper place for correction of defects. Correction of defects is not going to teach the child to read but they should precede the teaching process.
- f. The Ophthalm-O-Graph definitely shows irregularities in eye movements of individual pupils.
- g. The proper use of rythmical eye training exercises increases the speed of reading, decreases the number of fixations and increases the span of recognition.

Someone has stated, "If you can't read, you can't learn; if you can't learn, you can't earn." That jingle says a lot in a few words and it is our business as educators to do what we can to help pupils get ready to earn as well as learn.

Dr. Betts, in his book already referred to, says, "Adequate social adjustment to secondary-school requirements demands efficient reading habits." Two teachers who have been doing special work in reading improvement have reported that one of the outstanding effects of such a program has been a definite betterment in social attitudes.

ILLUMINATION AND EFFICIENT READING

Frank A. Hansen, Director,
The Western Institute of Light and Vision

There is so much that might be said on the subject assigned me this afternoon, that it has been rather difficult to know how best the time might be employed to give you what might be of the greatest value. It would be easy to tell you a pleasant story about the development of Man's eyes, as he emerged from obscurity. Down through the slow centuries, he did not have to worry much about anything but food. His eyes were well equipped to see large objects in the distance, and he was only about in the day, when Nature had supplied him with bountiful amounts of light.

As practical educators, you will wish to know just what effect illumination has on the problem of efficient reading today. Before we get into this, however, it might be well to remember that printing from movable type was only invented about five hundred years ago, and that the light sources of that day, other than the dim light which filtered through inadequate windows, was the tallow candle. From a careful examination of available records, we learn that each generation has vision which is somewhat poorer than the one just ahead of it. We also know that the eye-tasks of each generation have been more difficult than those of the preceding one. Reliable statistics illustrate the fact that over 20 per cent of the children in public schools have defective vision, and that this jumps to 40 per cent when the students are in college. Poor vision has seemed to be the price one must pay for education, up to now--the more education, the poorer the vision.

Many times, we can find a wealth of information in one example. And, since it is not quite so tiring to listen to as an abstract story with statistics, I am going to tell you some of the experiences of A.W. Ray, who is superintendent of schools at Sausalito, California. Mr. Ray had a very real personal problem of failing eye-sight. He was faced with the fact that he would have to discontinue graduate study at the university, and would probably have to abandon a profession in which he had already spent twenty years. He had spent several hundred dollars in the offices of optometrists and ophthalmologists, to very little avail. Now, I am going to piece together for you an occurrence which began somewhat over a year ago. This is taken from letters and a report which reached me last week.

Mr. Ray was sitting at his desk one day, discouraged and almost in despair, when the school nurse walked in about some routine matters and asked him about some routine matter. Then she asked . . . but let me quote from the report:

"How's the eyes?"

"I think I'm going blind", said I.

"Good!" said she. "I wish all school superintendents would go blind!!"

"Why?"

"Then maybe you would listen to the school nurses who are trying to get something done about the eyes of the poor kids."

"Why don't you nurses do something about it?"

"Too late. We didn't build these dark schools with their crazy desks and their blackboards and their dirty walls. And we didn't print all these books with type so small that no person, child or adult, should be reading it."

Mr. Ray reports ruefully that this was "only the beginning". For a full half-hour the school nurse went on. Then she got the record cards, and the things that were shown him there began slowly to bring him a picture of great masses of children who could not see the world they lived in. They were not blind, it was true, only partially so. Mr. Ray's own personal problem had begun to be impersonal. His report continues:

"Ideas went chasing through my memory: The purpose of the school is to develop intelligent men and women. . . We are not born with intelligence. . . We acquire it from the experience of living. . . In other words, we 'learn' intelligence. . . Most of what we learn comes through our eyes. . . If we can't see, how can we learn? . . . Why waste money trying to educate boys and girls who can't see? . . . Why can't they see? . . . What can be done about it? . . . Can anything be done? . . ."

(The conversation with the school nurse continues, since it intrigues me greatly to learn of a lady who will talk up to her superintendent in such a manner.)

"Well, suppose you school nurses were given the authority to do something about this problem. What would you do?"

"It would take more than 'authority'. It would take a mountain of money. First, it would take quite a sum to purchase glasses for the children who are born with certain eye defects. Then it would be necessary to feed the ones who did not have proper food."

This conversation continued for some time, bringing out such thoughts as: Normal eyes cannot see in the dark, and can only partially see when light is poor; when things are seen under poor light they are not fully understood. . . AND THEY ARE NOT REMEMBERED. The reader under poor light discontinues the unpleasant and fatiguing effort as soon as possible. If the buildings are constructed in such a way that the sun cannot find its way into dark corners, then it is necessary that artificial light be provided.

One outstanding sentence from Mr. Ray's report should be of interest to you, as it was to me: "Light, vision, learning and intelligence are closely associated. It is possible that there would need to be less teaching, IF THERE COULD BE MORE SEEING."

From this beginning, the Sausalito schools undertook the problem of determining the proper lighting conditions for best classroom seeing. As the problem began to unfold, it was noted that it was necessary to discriminate between the terms "looking" and "seeing". For instance, a printed page may be looked at, but not seen.

After all, the eyes are really cameras used by the brain. Light is the form of energy utilized by the eye in taking pictures which the mind may see.

When light and sight are considered from these viewpoints, it becomes quite important to the educator that the mind shall be permitted to look at...and see...retinal pictures which are distinct and undistorted...and spectrally true. If clear vision is not available to the student, the unavoidable result must be some degree of doubt, or ignorance, or delusion.

As the Sausalito investigation proceeded, it became increasingly clear that since education is very largely a matter of reading; and reading depends on seeing; and that seeing required light--the problem became a search for light--light of the proper intensity and intensity which possessed color qualities such as the eye finds in natural light out-of-doors. In case you feel this is simple of attainment, let me quote again from the report, showing some of the questions which arose:

"What color shall a school room be? What color ceiling, walls, furniture, floors? Shall there be blackboards, or greenboards, or blueboards or whiteboards? How high should the ceiling be--new buildings are being built so we should know. What ratio shall be maintained between windows, floor area, height of the room? What kind of desks should be used? Shall they differ for the various grades? Shall we use blinds or shades, and, if so--what color? Shall the window glass be clear or frosted? Shall we take the windows out all together? What color walls would we use in that case? What about dual duty classrooms--used for one thing in the daytime, another at night? Shall there be different colors for night work, different lighting? What is 'intensity'? What relationship does it have to various kinds of work? What kind of fixtures shall we use? What kind of light sources? What size lamps? How many fixtures per room? What about their arrangement--shall they be in rows, circles, concentric? What type shall they be--direct, indirect, semi-indirect, troughs or coves? How shall light be controlled--manually by pupils or teacher, or by automatic means? What standards of control should be expected--when should the lights be turned on and off? What color of light shall we strive for--white, blue? Which is best? How intense shall the light be on the desks? Would this amount create too much temperature increase? Should the amount of light vary with the ages of the children?"

Gradually, there developed a cooperative investigation which included engineers, doctors, optometrists, biologists, artists, physicists, physiologists, psychologists and numerous manufacturers. While the experiments are still going on, a very substantial progress has been made.

Of considerable interest were the tests made on a variety of color schemes. The most sought effect was that offering the greatest amount of neutrality--with the largest eye comfort. A blue-grey color seemed to have the desired effect. This is the color produced by Nature, in the early morning hours, just as the light begins to get strong enough for daylight vision. The trick in successful decoration of a room where considerable close eye-work is carried on, similar to the classroom is to select a color so neutral that the eyes will not focus on it too definitely. In other words, it is desirable to create the illusion of distance. Thus the eyes are "rested" when the student looks up from the close tasks imposed by reading text-book type.

In the Sausalito schools, however, the visiting mothers thought the grey-green rooms looked "cold", so that now an artist is experimenting with a color scheme which provides warm, earthy tints near the bottom of the room, together with greens and blues. The lightest tones with each color scheme tried were used on the ceiling, with the shades getting darker as they progress downward toward the writing panels. (It seems that we shall have to discontinue calling these "blackboards", for in Sausalito the boards are finished in dark gray-blue and dark gray-green.) The writing crayon is in yellow and in orange. The venetian blinds used in the experimental classrooms have their upper surfaces in white and their lower surfaces in blue. The desks and woodwork are finished to match the color scheme of the woodwork.

These classrooms are lighted with twelve fixtures each having a 300-watt lamp (classrooms being 23 x 31 feet), the fixtures being arranged with a photoelectric control which is an automatic switching device which gradually replaces daylight with artificial light, as the daylight fails. The artificial light is particularly uniform in coverage.

What a considerable lighting contrast is represented between this and the old system which had but one 300-watt fixture in the center of the room. The report makes some interesting comments about the children's appearance under the old and new environment. In the older rooms, the contrasts between colors in walls, ceiling, desk, decorations and equipment were all competing for the child's attention. And the children were submerged by this old-type of environment. In the new neutral-toned rooms, however, the children's bright colored clothes made them stand out like individual flowers. Average intensities of 35 to 45 foot-candles are maintained.

Going back to the long-range story of the development of Man's eyes for a moment, we must remember that Nature supplied him with eyes which saw the large objects of field and plain without appreciable muscular adjustment. It is only about five hundred years ago that someone discovered printing from movable type, and it is not a great deal longer

than that--speaking in terms of Nature's time--that Mankind came indoors and started living with only a small fraction of the light which it was planned that he should have.

After some early experiments with oil lamps of one kind and another, the tallow candle provided artificial light for many centuries. That is how the lighting term "foot-candle" came to be named, since it represents the amount of light which one candle throws on a surface which is one foot away.

As we trace Man's progress through those periods since we have had recorded history, we are able to determine that his visual tasks have been getting harder with each generation. Perhaps Nature never intended that Man should step in and make such progress. SURELY, SHE NEVER INTENDED THAT HE SHOULD PERFORM SUCH CLOSE EYE TASKS WITH INDIFFERENT LIGHTING OVER LONG PERIODS OF TIME.

From the best reconstruction we can make of people's eyes of long ago, they were greatly superior to those of today's generation. This was demonstrated by the discovery, recently, of what had been a sort of dawn-age Man, whose bones were found in a cave in Southern Europe. Evidently this chap had been an artist of fair ability, for he depicted various animals and scenes of his environment. What interests us from the visual viewpoint, he was able to see all ten stars in the Pleiades group. Today, the best any of us can do, unassisted, is to see seven stars in this group, although telescopes reveal that there are still ten and that they are still placed as this early cave-man had them shown. We know that some of the "old masters" of 400 years ago were bothered by astigmatism, for their excellent works show errors which could only be so conceived.

But the fact remains, that today we are living a very different life. Sometimes I wonder if we are not the victims of our own alleged civilization.

As educators, however, you have charge of the eyes of a number of children for several hours each day. And you are supposed to see to it that these eyes will transmit a certain amount of learning and intelligence to the brains behind them.

Lighting, then, should be an important concern to you. Not only the lighting of the classroom and its visual conditions, but the lighting in the home where the child does a great deal of his close work. Sometimes I know that a number of you feel that the homework you assign is being slighted; and perhaps you are right. But I can solemnly tell you that there are only about one percent of the homes in America which are adequately lighted for close visual work. The dining room has been jokingly referred to as the "Great American Study", but this is nearer the truth than you think. And we lighting men know that about all the special and atrocious sins listed in our catalogue of wrongs are usually found in the average dining room. What to do about it?

Well, I have told you the story of the experiments in Sausalito. We are trying, with every means at our disposal to provide a knowledge of the true situation to everyone. Perhaps the children of today are going to get a better chance than many of us in former generations had, for this seems an age of enlightenment. Newer and better teaching methods are employed, and research is continuously developing new facts which make for a richer and safer life.

Some of you realize that the students under your direction are suffering with eye strain, of which one large cause is faulty illumination. What is the condition in your classroom, and in the homes of your students? Only recently, we found in examining a school that the light provided in the auditorium where basketball was played was twenty foot-candles, while the light in the school library was less than two foot-candles. We recommended that the library be moved into the basketball court.

The amount of light, stated in foot-candles, is not always a good indicator of lighting conditions, however. We must avoid a greater contrast than ten-to-one, between the brightest and darkest parts of the room. Greater change than this is injurious. We must avoid glare, which has been aptly stated as being "light-out-of-place". The light must be diffused at the source as much as possible. For classrooms, we feel that the indirect system of lighting is superior to any other, since it provides good uniformity. The bulletin which accompanies this paper gives you a number of features considered in the lighting of sight-saving classrooms, which serve to explain the subject better. And, that you may know of our activities toward the education of people generally, we are giving each of you a copy of our bulletin SEEING which has had a wide distribution in Southern California particularly.

In closing, let me ask you to become, for your own sake and that of the children under your care, DARKNESS CONSCIOUS. Too long, we have been accustomed to living and working in semi-darkness. When we actually recognize this, and seek to find ways out, I am sure we will be able to find those ways.

PLEASURE-READING BOOKS FOR SLOW-LEARNING GROUPS
AT THE JUNIOR AND SENIOR HIGH SCHOOL LEVEL

Carol Hovious, Head of the English Department,
San Benito County High School and Junior College, Hollister, Calif.

Purpose and Method of This Paper

1. Many teachers, keenly aware of the reading difficulties of their pupils, have been seeking desperately for suitable books--especially for books adapted to slow-learning groups at the secondary level. In general, they look for three kinds of books: (a) skill-building books, designed to teach secondary pupils to read with greater speed, accuracy, appreciation, and intelligence; (b) pleasure-reading books, specifically written or edited for classroom use and designed to give pupils a core reading experience; and (c) free reading books, mostly from the trade field, designed to provide pupils with extensive, individual reading.
2. The supply of books suitable for slow-learning groups has long been limited. Recently, however, publishers have been making a genuine effort to provide suitable classroom materials.
3. This paper deals only with the second class of books--those designed for pleasure-reading in the classroom.
4. Titles have been chosen for their suitability for slow-learning groups at the secondary level.
5. To secure a fairly complete listing of all available books, each of the major textbook houses was asked to submit suitable books. The omission of a book from this list is not necessarily to be construed as a condemnation of the book. The book, for one reason or another, may not have been submitted by its publishers.

Not every book on the list will be suitable for every slow-learning class. Classes differ in (a) reading ability, (b) maturity, and (c) interest. For that reason, the list has been made fairly extensive, including books of varying degrees of difficulty, maturity, and interest. Annotations following the books will give the teacher some idea of the usefulness of the book in his classes.

This list is intended to serve as a basis from which the teacher may choose for further examination those books that will most nearly meet the special needs of his students.

Criteria for Selection

1. Physical format must be attractive. Books should not look dull, stuffy, and crowded. They should avoid the "textbook" look. Contributing toward attractive format will be:
 - a. Gay bindings.

- b. Colorful end-papers.
- c. Well-spaced pages. The page must not look heavy, crowded. There should be generous white space (at the margins and between the lines of print).
- d. Illustrations. Pictures should not be too "arty" and sophisticated. Retarded readers are realists, with limited imaginations. (Soft-focus camera studies from unusual angles, for example, serve only to puzzle, not to illumine, the slow-learning pupil.)
- e. Shortness. Retarded pupils prefer small books--"skinny" books, as one of them says. The reasons for this preference are obvious. (1) In the first place, a pupil who cannot read well will naturally be intimidated by a large and ponderous tome. A person with a broken arch would not enjoy a long hike; a child with a reading handicap does not enjoy a long book. (2) In the second place, slow-learning pupils have limited powers of concentration. It is inherent in their mental make-up that they cannot focus intently on any one task over a long period of time. (3) In the third place, poor readers, for the most part, "don't like to read". They have built up a defensive dislike for the thing they cannot do. If they are to be given a genuine liking for reading, they must find success in it. A short book, comprehended in a short time, gives the pupil a feeling of success and confidence. He has "read a book".

2. Content and style must be at once mature and simple. Secondary pupils are "young adults" in their social outlook, however limited they may be in reading ability. Retarded pupils are often over-age, and they tend to be more sophisticated than their classmates, perhaps because they have given their attention to social rather than to academic development. These pupils will not be talked down to. They demand maturity of content.

On the other hand, they cannot understand adult books. The style is too difficult; vocabulary, ideology, and sentence structure are all confusingly complicated.

For these people, then, must be found books at once mature in content and simple in style. The following considerations will be useful in determining the suitability of books for slow-learning pupils.

- a. Sentence structure. In general, books with relatively short sentences are more easily understood. (For an elaboration of this point, see Gray and Leary, WHAT MAKES A BOOK READABLE?)
- b. Vocabulary. Undoubtedly, difficult words make a book hard to understand. However, the difficulty of a word depends upon the thought complex in which it appears. For example, the words in the following sentence are all considered "easy" words,

within the knowledge of a fourth grader; yet, the setting in which they occur gives them a meaning far beyond the grasp of a fourth grader:

At the present time, labor has no authority over industry.

Furthermore, if a book is interesting in content and told in a lively, dramatic manner, it may contain difficult words without seriously retarding the pupil. He will be carried along by his interest in the material itself, regardless of the difficult words.

Vocabulary checks, then, are important; but they should be used in conjunction with other methods of evaluating difficulty.

- c. Subject matter. In the hands of a skillful writer the dullest subject matter becomes lively reading. However, there are some subjects that carry interest in spite of bad writing. Some of these are: movies, radio, airplanes, animals, adventure, Western stories, etc.

Certain sectional interests control the pupil's responses to material. In cattle country, for example, pupils will naturally be interested in horses, rodeos, roundups, and the like.

Personal interests also control responses to books. For example, there may be one pupil in a class with a passion for stamp collecting or for birds or for airplanes. He will be interested in books on these subjects, although they interest no one else in the class. (Incidentally, a pupil with such a special interest will often read difficult books in his special field--books more difficult than his general reading level would warrant.)

- d. The author's style and method. This element is the most difficult to measure objectively; yet it is perhaps the most important. A clever writer--who knows how to give his material drama, action, and suspense--can enliven the deadliest facts.

In checking for liveness of style, teachers will find the following considerations helpful:

1. Is the method expository--a straight, factual presentation of information? If so, it is liable to be uninteresting.
2. Is the method narrative? That is, is information broken down into actual scenes, into dramatic moments, into conversation and action? If so, it is probably interestingly told.

Teachers examining books for possible adoption may check the stylistic interest of the material by reading (a) the opening pages, (b) random page samplings throughout the book.

A List of Suitable Books

This list does not attempt to indicate grade levels. It cannot, for grade placement and reading ability do not correlate. A tenth grade boy may have sixth grade reading ability.

Instead, books have been starred. One star indicated very easy books; two stars difficult books. Unstarred books are of medium difficulty.

Prices are list prices, subject to the usual school discount.

Attention is called to the following series of books: Children's Bookshelf (Harper), Modern Literature Series (Appleton-Century), Academy Classics (Allyn and Bacon), Discovery Series (Harcourt Brace), Modern Classics Series (Harper's). New books are constantly being added to these series.

SUPPLEMENTARY READING LIST

Baldwin-Livengood. SAILING THE SEAS. American Book Company, 1920.
\$1.00

Sea-adventures of a boy, Tom Darke. Written at the request of the United States Shipping Board. Information done up in narrative style.

**Boyd, James. DRUMS. Scribner's, 1936. \$1.00
A vivid historical romance woven around American Revolution days. Good print. Most satisfactory with older students.

**Buchan, John. PRESTER JOHN. Thomas Nelson, 1910. \$1.00
A lively, well-written novel of mystery and excitement in Africa.

Buckingham, B. R. TOO MANY BEARS AND OTHER STORIES. Ginn, 1936.
\$1.08

From the Children's Bookshelf series. An anthology taking its title from the first story. Includes word study and reading comprehension aids. (Seventh grade.)

Buckingham, B. R. (Ed.). THE MASQUERADE AND OTHER STORIES. Ginn, 1934. \$.92

The sixth grade volume of the Children's Bookshelf series.

Cohen & Scarlet (Eds.). MODERN PIONEERS. Allyn & Bacon, 1931.
\$.60

Biographies of men like Chas. Lindbergh, Mark Twain, John Dewey, Maude Adams, Luther Burbank, etc. Academy Classics.

Cooper, J. F., (Ed. by Haight, M. N.). ADVENTURES OF THE PATHFINDER. American Book Company, 1909. \$.52
Simplified and shortened version.

Cooper, J. F. (Ed. by Haight, M. N.). ADVENTURES OF THE DEERSLAYER.
American Book Company, 1907. \$.52
Simplified and shortened version.

Cooper, J. F. THE LAST OF THE MOHICANS. Allyn and Bacon, 1927.
\$.80
An abridged and edited version by Ernest C. Noyes. Academy
Classics series.

Cottler and Jaffe. MAP MAKERS. Little, Brown, 1936. \$.90
Tales of the men who have helped discover the world--from
Herodotus to William Beebe. Ill.

Cottler and Jaffe. HEROES OF SCIENCE. Little, Brown, 1936. \$.90
Popularly told accounts of the work of such men as Copernicus,
Harvey, Lister, Gorgas, and Pasteur. Ill.

**Crane, Stephen. THE RED BADGE OF COURAGE. Appleton-Century, 1937.
\$1.00
School edition of an old favorite. Better for older boys.
Modern Literature series.

Dana, Richard H. TWO YEARS BEFORE THE MAST. Scribner's, 1924.
\$.88
A modernized and abridged version from which the technical details,
difficult and discouraging to young reader unfamiliar to the sea,
have been removed.

Davis and Getchell. STORIES OF THE DAY'S WORK. Ginn, 1921. \$.96
Narratives arising out of vocational interests.

**De Kruif, Paul. MICROBE HUNTERS. Harcourt Brace, 1935. \$1.20
A textbook version (ed. by Grover) of a best seller. Dramatic
stories about men of science.

De Mille, A. B. ADVENTURES IN STORY LAND. Allyn & Bacon, 1932.
\$1.00
A collection of short stories, mostly modern. Academy Classics.

**Doyle, Conan. ADVENTURES OF SHERLOCK HOLMES. Harper's, 1930. \$1.00
A collection of short stories in which Detective Sherlock Holmes
solves many a baffling mystery. Better for older students.
Modern Classics series.

Evans, L. B. (Ed.). THE PATHFINDER. Macmillan, 1930. \$1.20
Brief tales (grouped under such headings as "Good Sportsmanship",
"Love of Country", "Courage", etc.), each presenting a problem
in ethics. Good print. Not preachy.

**Finch and Parker. ROADS TO TRAVEL. Harper's, 1936. \$1.20
A collection of brief travel sketches. Suggested supplementary
reading lists after each selection.

Garland, Hamlin. PRAIRIE SONG AND WESTERN STORY. Allyn & Bacon, 1928. \$.60

Excerpts from the author's novels, short stories, and essays dealing with the early Middle West. Academy Classics.

Garland, Hamlin. THE LONG TRAIL. Harper's, 1935. \$1.00
School edition of Garland's novel of adventure. A young boy crosses the wilderness of the Northwest in quest of Yukon gold. Modern Classics series.

Garland, Hamlin. BOY LIFE ON THE PRAIRIE. Allyn & Bacon, 1926. \$.60
Semi-biographical sketches from pioneer days in the Middle West. Academy Classics.

Gaston and Gaston. MODERN LIVES. Allyn & Bacon, 1927. \$.60
Stories from the childhood days of such famous people as John Burroughs, Mark Twain, Cyrus Curtis, etc. Academy Classics.

*Hamlin, John. TALES OF AN OLD LUMBER CAMP. Heath, 1936. \$.80
Interesting facts about lumber camps skillfully interwoven into a narrative centering about the boy Joe. Readable print. Ill.

Herzberg, Max (Ed.). THE TERHUNE OMNIBUS. Harper's, 1937. \$1.20
Short stories, chiefly about dogs, collected in a school edition.

*Holloway, Emory. JANICE IN TOMORROW-LAND. American Book Company, 1936. \$.72
Six adventures in the life of Janice. Simple, readable narrative. Good for younger girls.

**Hough, Emerson. THE COVERED WAGON. Appleton-Century, 1926. \$1.00
School edition with teaching aids at the back of the book. Novel of adventure in pioneer days.

James, Will. SMOKY, THE COWHORSE. Scribner's, 1926. \$1.00
The story of Smoky is the story of the old West, told in cowboy lingo. Good print, catchy illustrations, lively narrative.

Leary and Persing (Eds.). CHAMPIONS. Harcourt Brace, 1937. \$1.00
Entertainers, doctors, nurses, athletes, social workers, circus performers, etc.--all find themselves briefly sketched in these twenty-three short biographies.

McSkimmon & Lynch (Eds.). THE MAGIC SPEAR. Allyn & Bacon, 1929. \$.60
A collection of short stories and incidents centering around dramatic situations demanding choices that involve problems of conduct and ethics. Academy Classics.

McSkimmon & Chiesa (Eds.). THIS INTERLOCKING WORLD. Allyn & Bacon, 1929. \$.60
An anthology of short selections (various literary types) designed "to promote better international relations through acquaintance and understanding." Academy Classics.

- *Melville, Herman (Ed. by Bates). *MOBY DICK*. Scribner's, 1928.
\$.88
A very much shortened and simplified version of the original.
- Miller & Leary (Eds.). *NEW HORIZONS*. Harcourt Brace, 1936.
\$1.00
An anthology of high adventures by such modern writers as
Lindbergh, De Kruif, Lowell Thomas, etc.
- Mirrielees, Edith. *TWENTY-TWO SHORT STORIES OF AMERICA*. Heath,
1937. \$1.24
A lively collection dealing with American life. Attractive format.
- Moderow, et al. (Eds.). *SIX GREAT STORIES*. Scott Foresman, 1937.
\$1.20
Simplified version of *TREASURE ISLAND*, *THE LEGEND OF SLEEPY HOLLOW*,
RIP VAN WINKLE, etc. Exceptionally attractive format (pictured
end-papers, large print, illustrations--a generally "readable"
book).
- Mullen, S. M. & Lanz, M. C. (Eds.). *THIS NEW AGE*. Century, 1930.
\$1.12
A collection of articles about the modern age of science (mining,
trains, telephone, phonograph, aviation, engineering, radium,
etc.); objective tests after each article.
- Mullen, S. M. & Lanz, M. S. (Eds.). *PLAYING THE GAME*. Appleton-
Century, 1928. \$1.12
A collection of sport stories.
- Niebuhr, Hulda. *GREATNESS PASSING BY*. Scribner's, 1931. \$1.50
Stories of people who were "great" because of their service to
mankind, even though they were little known.
- Obear, E. H. (Ed.). *BOOK OF STORIES*. Allyn & Bacon, 1928. \$.80
A collection of short stories, largely modern. Academy Classics.
- Persing & Leary (Eds.). *ADVENTURE BOUND*. Harcourt Brace, 1936.
\$1.00
A series of interesting articles grouped under such heads as "With
Radio Announcers", "With Air Mail Pilots", "With Hunters and Ex-
plorers", etc.
- Persky, Louis J. (Ed.). *ADVENTURES IN SPORT*. Ginn, 1937. \$1.12
A collection of sport stories; exceptionally attractive in format.
- Pyle, Howard. *MEN OF IRON*. Harper's, 1930. \$1.00
School edition of Pyle's novel of life in the fifteenth century.
A boy goes adventuring in the crusades.
- Rice, Alice H. *MRS. WIGGS OF THE CABBAGE PATCH*. Appleton-Century,
1937. \$1.00
Girls always enjoy this book. Modern Literature series.

Roberts and Miller. LET'S READ. Holt, 1937.

Modern magazine material arranged under six heads (such as "Animals", "High Speed", "People", etc.) Reading aids at the end of each section.

Rush and Winslow. THE SCIENCE OF THINGS ABOUT US. Little Brown, 1930. \$.90

How paper is made, how wall paper is designed, how rugs are woven-- these are typical subjects discussed in this factual miscellany dealing with the scientific background of the things we use daily.

Sandburg, Carl. ABE LINCOLN GROWS UP. Harcourt Brace, 1935. \$1.00
A school edition of Sandburg's biography.

*Seeley and Lane. CHINOOK AND HIS FAMILY. Ginn, 1930. \$.92
A very simple book about the sled dog, Chinook. Information in semi-narrative form. Silent reading exercises are provided in an appendix. Useful for very poor readers.

Stevenson, R. L. THE BLACK ARROW. Allyn & Bacon, 1926. \$.80
The Academy Classics edition.

*Stevenson, R. L. TREASURE ISLAND. Heath, 1936. \$.68
A simplified version edited by Dunshee and Ludeke. Vocabulary limited to 2300 words. Average repetition of new words is 18. Objective comprehension tests (end of book) for each chapter. Large print. Recommended for weak pupils.

Theisen & Leonard (Eds.). REAL LIFE STORIES: REAL ADVENTURES. Macmillan, 1929. \$.96
Brief dramatic excerpts. Good print.

Theisen & Leonard. REAL LIFE STORIES: TALES OF COURAGE. Macmillan, 1929. \$.96
Short dramatic incidents calling for high courage. Good print.

**Twain, Mark. ADVENTURES OF HUCKLEBERRY FINN. Harper's, 1931. \$1.00
School edition of an old favorite. Modern Classics series.

**Twain, Mark. ADVENTURES OF TOM SAWYER. Harper's, 1932. \$.80
School edition of an old favorite. Modern Classics series.

Underwood, W. L. WILDERNESS ADVENTURES. Ginn, 1927. \$.80
Brief nature-lore tales.

Wade, Mary L. THE NEW PIONEERS. Little, Brown, 1936. \$.85
Edison, Theodore Roosevelt, Goethals, Herbert Hoover, Henry Ford, Admiral Byrd, and Luther Burbank are the "new pioneers" of this volume.

Webster, Jean. DADDY-LONG-LEGS. Appleton-Century, 1937. \$1.00
A perennial favorite for girls. Modern Literature series.

****Westcott, E.N. DAVID HARUM. Appleton-Century, 1931. \$1.00**
From the Appleton Modern Literature series. The humorous novel from which the picture (starring Will Rogers) was made.

White, S. E. DANIEL BOONE. (Edited by Helen Hawkins). Allyn & Bacon, 1926. \$.45
A biography built around a colorful figure in pioneer days. Academy Classics.

***Wolfschlager, Irene H. MOCCASINED FEET. Ginn, 1929. \$.72**
The story centers around the adventure of Pierre, a hite boy, among the Indians in pioneer days. Very simple. Useful for younger boys.

Hersberg and Mones. AMERICANS IN ACTION. Appleton-Century, 1937. \$1.00
Seventeen brief biographies of famous modern Americans (Jane Addams, Luther Burbank, Clara Barton, etc.). Drawings. Good print. Useful teaching aids.

EYE-SIGHT AND LEARNING

Louis Jaques, Optometrist, Los Angeles

Before anyone can comprehend the fascinating relationship between seeing and learning, he should have a general picture of the biological development of eye-sight. This matter of the evolution of seeing is, of course, a great study all by itself. My friend and colleague, Thomas Atkinson, M.D., who is with the faculty of the Northern Illinois College of Optometry, fortunately lectured on that very subject at our Convention in Miami in 1936; and I can quote you his concise and illuminating remarks:

"The lecturer is not here concerned with embryology and neural pathways except as they represent physiologic fixations of biologic processes.

"It is now quite a few years since optometrists graduated out of sheer optics into physiology--a most significant step in the progress of optometry. But even physiology, in and of itself, holds no key to itself. A living organism, including man, is but a single film in a moving-picture reel, having no intelligible meaning unless the entire reel be run in its sequence. Physiology is in part fixed biology, and in part biology in the making. It can be intelligently interpreted only in the light of the larger sweep of biological development.

"Biologically, the visual elements of the eye are a photosensitive piece of protoplasm; a receptor for carrying out a phototropism; which has undergone certain developments and improvements for the facilitation of its performance.

"Phototropism is not confined to the eye. It was originally a function of the envelope, or skin-organ, which still retains some of this tropism, as witness the production of pigments and vitamins under sunlight. Such reactions are spoken of as 'organic' in distinction from the 'visual' effects of light. Whether the specialized organ of the eye still shares these organic reactions with the skin, or has largely lost these primitive reactions in the development of its peculiar visual quality of reactions, is a question which need not be discussed here.

"In general, one recognizes four stages in the biological development of the eye, each stage manifesting a genuinely new idea or invention: (1) The eye-spot, which is the original prototype of the retina. No new feature has been introduced here--merely higher degrees of specialization, with the development of rods and cones, macula, and fovea. Along with eye-spot must be recognized another essential primitive phototropism, namely, the turning of the sensitive spot toward the light stimulus. In the case of the original eye-spot this was accomplished by movements of the entire body, or at least by the upper part of the body. But, however, accomplished, it was and is an essential phototropism. In terms of later physiology, therefore, we may list the tropic reactions of this evolutionary stage as being:

Retinal adaptation

Fixation

(2) The camera eye. Here we see the incorporation of the first new 'idea'--a transparent vesicle, more or less globular in form, to intensify or 'focus' the light upon the sensitive spot. With the further specialization of the retina, refining the light stimulus into an image-stimulus, a mechanism appears for the purpose of adapting the focus to the demand. Early in the history of the camera eye we also find a muscular mechanism for turning the eye toward the stimulus without moving the body, but this does not represent any genuinely new idea. In the original camera eye, then, we find these tropic features:

Retinal adaptation

Fixation

Adaptable focus

(3) The double monocular camera eye. Coincident with the development of a coordinating nervous system and the division of the organism into two symmetrical lateral halves, two camera eyes appear, one for each side of the field. Each, however, is a separate and distinct visual field. The fields are no doubt associated in some fashion in the mind, but not as a part of the visual mechanism. Thus we list the tropic features of this stage as:

Retinal adaptation

Adaptable focus

Fixation

Double monocular field

(4) The paired binocular camera eye. Here the two eyes are so placed that in a state of rest light-waves from the same object fall upon corresponding areas of the two retinas, creating a binocular field, which must be unified. Out of this state of affairs arises the necessity for varying the fixation tropism so as to fixate stimulus-sources of divergent light (convergence). This, however, cannot be regarded as a wholly new tropism, but merely as a variation of the original fixation tropism. Last, there develops through experience an association or conditioning between the two acts of focus and fixation. The list of reactions in this stage thus comprises:

Retinal adaptation

Paired binocular field

Fixation

Convergence

Adaptable focus

Unification

Focus-fixation Association

"Now it is evident that those tropic reactions which were developed in the lower stages will appear in man as a biologically inherited, fixed tropism. It is equally evident that those reactions which were not present in the lower stages cannot be biologically inherited, but must be individual to the human race. We may, therefore, classify the reactions of the visual mechanism in man according to this division:

Inherited: Retinal adaptation

Acquired: Unification

Fixation

Focus-fixation Association

Adaptable focus

ciation

Double monocular field

"The double monocular field is included in the inherited features, because this is, in fact, what man inherits. The pairing is the purely mental result of unification. Convergence is omitted from the classification because it holds a dubious place. Undoubtedly the fixation tropism which underlies convergence is inherited; but the variation of it into convergence may or may not be acquired. It is, at any rate, inherent.

"For the performance of all of these reactions, native or acquired, certain canalized paths of operation are developed, technically known as 'brain patterns'. And the brain patterns may likewise be divided into four general classes:

"(1) Innate. In this class are the patterns which are present and operative at birth. In vision, they include retinal adaptation, pupillary reflexes, and fixation (rotations), also tonus and reciprocal innervation and inhibition of innate muscle-functions.

"(2) Inherent. Patterns of this class, while not operative at birth, appear so spontaneously and at such an early age, as to warrant the conclusion that they await only the development of the mechanism. Convergence is in this class; so, also, is a certain adaptable development of focus.

"(3) Acquired. These patterns have to be developed by each individual child; are not developed precisely alike in any two; and are not necessarily developed at all. Unification (commonly called fusion) and accommodation-convergence association are in this class.

"(4) Selective. These are merely acquired patterns of an unusual character, in which certain individuals, by training, occupation, etc. develop extraordinary expertness.

"In the development and use of the innate and inherent patterns every individual grafts upon them something of his own acquired patterns. Thus, the essential pattern of walking is inherent; but every child grafts upon it his own acquired pattern of walking, according to his individual structure, imitation, etc. The same is true of the patterns involved in vision. The finished act is always a mixture of inherent and acquired patterns. One may not, however, with impunity violate any inherent pattern with his acquired ones.

"It is with brain patterns, chiefly, that the optometrist deals; particularly with the acquired patterns of unification and association, and their relation to inherent patterns. It is therefore highly important that he should recognize the classification of the patterns in their biological order, for at least the following reasons:

"(1) The patterns are amenable to influence and modification in precisely their reverse order. Selective patterns are the easiest to change; common acquired patterns next; inherent patterns can be changed, but with difficulty, and with due regard to violations of their laws; innate patterns are not susceptible of modification by any optometrical means.

"(2) We thus learn the sequence of their development, and by implication the proper sequence of their re-education. It is useless to try to remedy defects in one pattern unless and until those of underlying patterns have been corrected.

"(3) Many of the ocular dysfunctions with which we are called upon to deal represent violations of innate or inherent patterns by faulty acquired ones."

Most of us assume that seeing is just one simple faculty. From what I have quoted, you will understand that seeing is a coordination of many faculties and skills. It is the coordination of these faculties into harmonious team work that makes efficient seeing. Outstanding requirements are clearness of vision and oneness of vision. When these two functions work together, we have high visual efficiency. The absence of this team work creates a multitude of handicaps, not only in children, but all through adult life.

Paired binocular fields have come to man through evolution. They came late in the development of human vision, but added tremendously to man's mastery of his environment. Binocular vision brings to man the benefit of a range finder system of seeing, giving us judgment of height, distance, space, stereopsis, etc.

These benefits are not ours at birth. They are inherent and are ready to develop by use very soon after we are born. It is my thought that we learn to see in much the same manner as we learn to speak, to walk, to ride a bicycle, etc. In the past all of these skills have been learned by trial and error, and even the finished product has been far from perfection. To check this, consider the excellent results from training in posture that is now given to so many school children. Consider the splendid work that has been done in speech training. To continue this line of thinking--why is it not just as possible to train children to see efficiently? Why should not such training greatly improve the capacity of the child to learn?

To my mind efficient seeing is a skill, and a child may or may not have acquired this skill before he comes to you as a student. Our surveys show that few have reached anything like perfection. School room results show that help is urgently needed. Isn't it likely then that we have two problems to face? (1) the basic preventive work, and (2) remedial efforts for those already in trouble. If it can be shown that unification and focus-fixation association are acquired skills, then it can be argued that they can be taught. Some of this teaching comes within your scope as educators, and some of the burden must rest on specially experienced optometrists. It will be shown that certain mechanical aspects of the seeing apparatus can, and frequently do, affect the psychological aspects of learning. This, of course, is where you are deeply interested. Let us try to understand, therefore, just what a baby inherits in the matter of visual capacities. The baby comes into the world with the following:

- (a) Two eyes, and double fields of vision (one in each eye).
- (b) The mechanism of an adaptable focus.
- (c) The ability to turn the eyes to focus objects.
- (d) Each eye equipped with a retina and optic nerve connection to the brain.

Under (a) it can be shown that the new-born baby has double vision, which we call diplopia. Each eye wanders without apparent relation to the other. An experiment with a flickering candle will frequently show one image to be in the center of the pupil of the focussing eye, while the image on the other cornea will move about, as the eye wanders away from its fellow. Please note at this point the absence of attention, of interest, in any of the psychological factors that must enter into efficient seeing.

In normal development both eyes tend to move together, because that is the inherent pattern of seeing. When this happens, we say the baby has acquired fusion, or unification of the images, for the purpose of keeping the two centers of sight on the object of fixation.

In viewing an object at a distance, the axes of the center of sight are said to be parallel, and any intervening object between us and the thing looked at is seen double--through a psychological device the brain ignores these double images. Now assume that the object to be viewed is nearby instead of at a distance. The parallelism ends, for the axes of the centers of sight now must turn in toward each other. This amazing demand on the versatility of the eyes represents one of the greatest problems of training, and it is a faculty that many children learn imperfectly.

The turning of the two eyes inward toward each other to obtain fixation on an object at a near point has been called convergence. It is accomplished through what is aptly called the triangulation reflex. This impulse has as its motive the avoidance of double vision, or diplopia. Here is a seeming paradox--everything except the particular object at which we are looking and in which we are interested is seen double at all times; but these images are ignored by the higher brain centers. The thing to keep in mind is that the object of regard, the thing that arouses our attention, is responsible for setting the triangulation reflex into action.

There are five major parts to this reflex divided roughly as follows:

- (1) An object is seen as two images. This is the stimulus received by the retinae.
- (2) Impulses are sent to the brain telling of this condition.
- (3) These impulses are transferred to motor centers in the brain.
- (4) The motor centers send impulses to the extra ocular muscles to converge.
- (5) They act and complete the reflex.

This fifth action is accomplished through reciprocal innervation. The impulse to contract the in-turning muscle is accompanied by a

similar impulse to cause the out-turning muscle to relax. This very complicated act is accomplished thousands of times a day, and especially comes into play while reading.

Under (b) we consider the mechanism of an adaptable focus. This mechanism is present at birth, but is no more ready for use than are the child's legs ready for walking. The child must learn to focus.

The crystal front part of the eye called the cornea receives the rays of light and brings them to a partial focus on the retina. To secure exact focus, nature provides a tiny crystalline lens behind the cornea about the size of a garden pea. Surrounding this lens is a muscle called the ciliary which in some manner contracts and expands to make this crystalline lens more or less convex according to the focal demand. The words "in some manner" are used advisedly, because no one knows for a certainty exactly how focus is accomplished. I should like to say here, however, that the eye is not like a camera. You have heard this statement ad nauseum. A camera is brought into focus by changing the distance of the sensitive film behind a lens of focused power. In the human eye the lens power changes to meet the focal requirements--changes hundreds of thousands of times each day.

The accepted theory about this focussing mechanism is that the crystalline lens is held in place by a suspensory ligament which surrounds it and is in its least convex shape when the ciliary body is relaxed; and in its most convex shape when this ciliary body is in a state of attention. Remember, however, that this is merely supposition.

In any event, focus comes about through reflex action and the five parts of this reflex are believed to be as follows;

- (1) Unfocussed light falls upon the retina and causes a sensation of blur.
- (2) This blur disturbs the brain center.
- (3) The disturbance is noted and referred to motor centers for action.
- (4) The proper stimulus is sent to the ciliary body.
- (5) The ciliary body acts, adjusting the crystalline lens, and the light is brought to a clear focus.

Let us now consider item (c), the ability to turn the eyes and focus objects. The center of sight for "letter vision" is called the macula lutea. It is an extremely sensitive area at the back of the eye. It is a part of the retina, and the remainder of the retina, outside of the macular area, is called the field of vision. When an image falls on any part of the field of vision in normal development, it is the instinct of fixation to bring the macular area under the image. It is one of those marvels of human mechanism and it causes the eye to turn in the direction of the image, or object of regard. This ability is inherent and, if it is lacking in a child, it cannot be corrected by training.

Now we come to (d) the retina and the optic nerve. The retina is a continuation of the optic nerve spread out like a sensitized film over the back of the eye, which indeed it is. The retina receives any and all images focussed on it and sends them back to the brain centers. We make a considerable distinction between brain and mind, and conceive the mind to be where the final interpretation, the crux, of seeing takes place. A perfect pair of eyes may send messages to a brain center, but the seeing will be of little value until the mind is capable of interpreting the report. On the other hand, we know from experience that an image seen through imperfect, distorted mechanisms may be capable of good interpretation by an excellent mind. It is the mind that counts, and I hope to show you how to determine just when it is inefficient seeing which causes lack of attention and interest, as differentiated from mental incapacity or retardation.

At this point I want to make a distinction in definitions to aid you in understanding clearly my subsequent remarks. When we speak of something being "learned" to an educator, he naturally thinks of a conscious educational process, although he is perfectly aware that a learning process is going on in the subconscious and unconscious levels. In optometry we speak of "learned associations" and in our profession we think of the use of the word "learned" in this sense as applying more specifically to the unconscious and subconscious levels. It seemed only fair to warn you of this for inadvertently I may use the word "learn" in an optometric sense and you might interpret it in a scholastic sense. It might be more accurate for us to use the word "acquired" sometimes; this is the apt word--at other times "learned" seems more suitable.

The normal child acquires (1) unification, and (2) focus fixation association.

(1) Already I have given you a picture of this one-ness of seeing, or unification. At the moment I merely want to indicate that, while it is of tremendous advantage to mankind, there is nevertheless a price attached when, for any reason, the two eyes do not work in harmony. More of this later.

(2) Focus fixation association. After the child has learned to fix an object first with the dominant eye (children who are normally right-handed as a rule have the right eye dominant), then the non-dominant eye must learn to follow almost instantaneously in reaching fixation. Next the faculty of focus (clearness) must develop. Then comes the complicated task of learning to fix and to focus both eyes at one and the same time.

Keep in mind that mechanism that accomplishes this double function is in itself dual. The fixation activity is controlled in the somatic or volitional nervous system along with the movements of hands and feet. The focussing activity is controlled in the autonomic or involuntary nervous system along with the action of other vital functions of life such as the beat of the heart, breathing of the lungs, etc. Do you then get the picture of an integration of two neural

and two muscular systems? In optometry we speak of this complicated action called seeing as being reciprocal innervation. Not only must these functions be reciprocally innervated, but these innervations must occur practically simultaneously. When all of this happens we have an excellent seeing mechanism.

We estimate that normally it takes six full years of play and eye and hand movement adjustment for a child to acquire this general capacity. In that time, it may, or may not, have accentuated certain skills, but, in a general sense, it is ready for visual work. It may be well to remember that seeing is work. It has a bearing on scholastic attainment.

I shall not go into the psychology of learning to read. You are, of course, more familiar with this field than any other group by virtue of your specialized training.

Up to this point I have been striving to show that the mechanical or physiological use of the eyes is something that has to be learned. If it is something we learn, is it not possible that conscious training, or education if you like, will develop greater facility than mere haphazard development? If the faculty has not been learned properly, it will be necessary to break up present habit patterns and establish more successful ones.

It seems to me that the progress of civilization requires the solution of this problem if we are to continue to turn night into day; to exert great efforts on immature nervous systems; to require more and more reading as a part of our educational system. Unless the visual apparatus is fitted for the load, more and more failure in our school system will be noted.

Need I point out that even at the present time the classification of pupils into "advanced", "normal" and "retarded" implies a recognition of the presence of some handicap. Your psychologists will tell you when that handicap is the result of a low I.Q. Your trained optometrists will tell you when that handicap is the result of a low visual capacity.

Although I hate to repeat that old bromide and, although I do not guarantee the percentage, yet we do know that approximately 75 per cent of our knowledge comes to us normally through the visual faculty. Is it not high time that something is done about the problems of learning to see and to read efficiently?

Is it common sense to go on as we have in the past allowing the child's visual capacity to break down, and then patch and repair? The problem of prevention is of the utmost importance. Remedial work we must do to help those who have already fallen beneath the load. Parents today know little more about the eye-sight of the children under their care than was known in the dark ages. Teachers, I am thankful to say, are giving this matter more and more attention. Educational psychologists agree that it is one of the factors of paramount importance in our education system.

Since it takes a minimum of six years for a child's eye-sight to develop and for him to learn to use his eyes as a team, the proper time to serve ALL children is at the six year age. This is the outside limit, and special cases should be checked up before that time.

What can be determined about a child at that age? The survey work must rest on the school teachers. I do not see it as a special designated work for one member of the school staff--to me it is a function of the room teacher. Why? Because she is in constant contact with her children and thus can note the correlation between visual efficiency and school room projects. In the beginning it may be wise to have some one person equipped as a center of information, but eventually the survey work should come within the charge of the room teacher.

To my mind it is entirely possible to equip this room teacher with the ability to make these surveys without heavy equipment, and without the expenditure of too much time. She should be able to group her pupils into three classes:--

- (a) Those with competent visual capacity.
- (b) Those now competent but indicating future difficulties.
- (c) Those who already have a visual problem.

All of this is comprised in the work of optometry, but no great technical education is necessary in making the surveys. Remedial work, when it comes to physiological optics must of course rest in the hands of the trained optometrist. The teaching of efficient reading, however, is very largely a part of the school responsibility. I hope I have made clear the division of work that ultimately must prevail. I cannot believe that the surveys should be made by trained optometrists; neither can I believe that remedial work is within the range of the school room.

There are eight determinations of visual capacity to be made on the six year old child. They are:

1. The visual acuity of each eye separately and then as a team for distant and close seeing.
2. The curvature of the front refracting surface--the cornea.
3. The physical formation of the eyes.
4. The exact focussing power of the eyes (the so-called refractive error).
5. The team work of the eyes, if any.
6. The accuracy of fixation, or the lack of it.
7. The percentage of efficiency of the two eyes as a team.
8. Readiness to read and study.

Equipment is available so that teachers can determine accurately enough for survey purposes, items 1, 5, 6, 7 and 8. Items 2, 3 and 4 fall within the work of the optometrist in his office.

You are not to understand that this is all there is to render the remedial work. Neither space nor time permits the development of many collateral features. For the purpose of this paper I wish to discuss items 1, 5, 6, 7 and 8.

1. Vision. It is altogether desirable that the child shall be able to read small letters at a distance. However, seeing letters as such at a distant point is no longer the Alpha and Omega of vision. Too many children can see all and know little, while others, in spite of seeing little, know a great deal. The practice of recording simple distance vision and sending home a report of "perfect sight" is a barbarous custom. It gives a false sense of security. It throws blame on a blameless child and does not begin to touch the heart of the seeing problem.

It must be remembered that the eye has not the faculty of vision--it is merely the receptor of visual sensations and no more digests the information received than does the mouth digest food. Vision is not the simple formation of an image on the retina, but involves a complete psycho-physiological function covering all of the physiologic activities I have mentioned, and then involving perception, conception, motion, thought, memory and knowledge as a whole. Vision is of the mind, as well as of the body, and it is impossible to separate the two for one constantly reacts on the other.

5. The team work is determined by and through the use of the stereoscope. It is possible for each eye to see a different picture and yet create the illusion of one picture when unification exists. The picture commonly used is of a leaping dog before the right eye, and a pig with a hoop over its back before the left eye. The report of the student determines the team work. If the child reports that he sees a dog jumping through a hoop on the pig's back, when the dog is halfway through the hoop, we know that the eyes are working simultaneously. If the dog alone is reported, we know the left eye is not being used, and if the pig alone is seen, then the right eye is not in use. Other stereoscopic cards are used to determine the efficiency of this "two eyes at once" vision.

6. The accuracy of fixation or its lack. The child is asked to take a pointer in the right hand and touch the nose of the pig. A child having "projection" does this easily. The pointer is then placed in the left hand and the experiment repeated. The presence of projection means that no matter what difficulty is involved the child is seeing with both eyes, even though such use may require such effort that attention, interest and the desire to read are lost in the effort of unification. This is what I mean when I say that seeing is work.

7. The percentage of efficiency of the eyes as a team is determined by a new method called "the percentage of macular stereopsis". This will be demonstrated as it will take too long to describe it.

8. Readiness to read is demonstrated in a number of ways. One system that is receiving wide acceptance is called the "ready to read" stereoscopic cards developed by Dr. Emmett Betts of Oswego, New York. These cards must be demonstrated, because of lack of time to describe them. Dr. Betts has made many contributions in

print which are available for your study.

All tests used to demonstrate reading readiness, however, fall somewhat short of the mark, because readiness to read and vision itself is of the mind. The desire to read ought to come early in a child's development, if the home environment is at all favorable. After all, pictures are read, for what is type but a series of formalized pictures. Still, in all, this desire to read must survive physiologic and psychologic handicaps. I need not point out to you that today reading is no longer taught as a subject, but is now a means to an end. You have here a problem in teaching psychology which has been so well covered by many educational authorities that I shall not discuss it. I would like to point out, however, that attention, interest, desire and the will to do all depend on a physiologic capacity, although they are in themselves psychologic faculties. The act of attention, so far as seeing is concerned, is described best perhaps by Wundt's comparison of consciousness to the field of vision. He states that in the eye there is a point of clearest vision, where all impressions are extremely distinct as opposed to the vagueness of objects seen with other parts of the retina; so in the mind there are always a few processes which stand out clearly, while others are blurred and indefinite. As the eye can wander over various objects within its range, bringing first one and then another into the most favorable position, so the sensations of which we are conscious at one instant, disappear from consciousness at the next. Attention may wander over the mental field, as the eye wanders over an area in the outside world.

Attention INCREASES THE CLEARNESS OF THE SENSATIONS ATTENDED TO, but is it not difficult to describe what is meant by clearness? Everyone knows what is meant by the term and has experienced the change which actually goes on. It means largely that some one element of consciousness is picked out from the others and given an advantage. It thus more adequately becomes a part of our experience than others. Clearness is then purely a relative matter. All mental processes affect us in some degree, but those processes to which we attend affect us in a much higher degree than those to which we do not attend.

The better the mind the better the attention. One can bring reading matter to the attention of an idiot and receive no response, while a child of normal, or better than normal mental ability, is easily interested in the subject of reading.

Attention, interest, desire, and the will to do are all conditioned psychologically on the physiologic effort involved. The motore centers seem to determine whether or not the task is worth doing. Under great emotional stress the complacency of these motor centers is disturbed, but in reading we do not as a rule find this tremendous muscle motivation; consequently, while a child with normal physiologic seeing meets and masters its reading problems, the child with any handicap lacks all of the backgrounds of interest, desire, and will to do that will carry it through its

studies. Should we not be very careful to know whether this inertia on the part of the child is the product of low mentality, or of visual handicaps?

True visual skill, it seems to me, should ultimately pass below the level of conscious attention and become an automatic response to stimulus. So long as conscious attention is involved, effort or work is required. Watch a child as it learns, through trial and error to speak or to walk, and note that the effort involved is a genuine burden on the child. As these functions are reduced to automatic responses, effort is noticeable only under excessively prolonged usage, and even here effort is conditioned on training, for we have historic examples of omnivorous readers and tremendous walkers.

Our task then is to reduce the mechanical effort to the automatic level, as soon as possible, so that consciousness is not required to sit on the job and do the work of the subconscious. Otherwise there will not be enough conscious mind available for work on the learning level. Thousands of children are branded as stupid, because of this specific handicap.

Apply this condition to reading. The child fixes and focuses a word, identifies it, and goes on to the next word, at which point his eyes waver and his conscious mind steps in, holding both his eyes and the mind to the task, for he must see, identify and interpret. After reading a few lines he looks up for relief, the attention wanders and you have the beginnings of a behavior problem--a bad boy in the making. The sheer mechanics of focus and fixation can call on and deplete a high percentage of conscious mental effort, and when this condition arises, interpretation and learning suffer.

We determine the behaviour of the eyes by various tests and judge from this behaviour what is going on behind the eyes. Lately there has come in use a motion picture camera for photographing these eye movements. I will demonstrate a simple and reasonably accurate method in determining eye movements in reading.

A small card, with measured words within the vocabulary age of the child is held so the operator can see and record the movement of the eyes from word to word--or in better students from idea to idea. Each eye stop is called a fixation, and each time the child looks back to a word previously passed, the movement is termed a regression. Your duty is to count the stops and regressions. With a little practice one can become proficient in observing these activities and gaining a knowledge of the eye habits of the child under observation.

You will not know what they mean because, so far as I can learn, no one yet has found the correct answer to that problem. One man says that the fixation is for the purpose of "stopping to see"; another says that the stop is to correlate what has been

seen during the previous stop with that which is seen in the present stop. One says that regressions are a sign of bad habits; another interprets regressions as the sign of a doubtful mind (that the child looks back to be sure), and still another that the child cannot remember the content of the last "eyeful".

One of the best descriptions of why we stop, because it indicates why we stop longer and more often in scientific or studious reading than we do in fiction, was published in the Journal of the American Optometric Association, June 1936, written by C. W. Woodmansee, Director of the National Institute for Visual Learning:

"People think in terms of mental pictures. These pictures are cast upon the mental screen by words, chiefly nouns. Attend the sound of these words and note the mental picture they conjure up in your mind.

City Hall -- Automobile -- Home -- Butcher Shop -- Sausage

"Each word a mental picture, but the process is so natural, its true significance is rarely appreciated until we pause to observe it--yet, every human being has thought in these terms every conscious moment of his life, for, in truth, there is no other way in which we can think. We become conscious of this process only when we pause to see the fact instead of merely listening to it.

"When I mention the sound 'pencil', I have an auditory symbol of the fact. I spell out the letters p-e-n-c-i-l and I have here the second auditory form of the same fact; then, I look at this pencil. I here have a third form of the same fact--this is the substance form. Then I lay aside the pencil and revive in my mind's eye a mental picture of it and I have here a distinctly additional fourth form of the same fact, that is, the visual form and that form is the most intimate form in which the fact can approach the mind. In using this form of fact we are truly using the imagination as a constructive force which William James defined as 'the premier faculty of the mind'.

"Recognizing that words are symbols of meaning, it requires given time for the symbol to carry meaning in the mind, that is, visual meaning, which means understanding and memory of meaning. A camera, instantaneous as it may be, does require a given amount of time to register an image on the plate or film. If it is underexposed, we have an indistinct image. We can hold a lens and focus the sun's rays, but we must necessarily pause to steady the glass or there will be no flame. In the same way, TO CENTER THE MIND AND FOCUS THE FACT to light the inner flame--WE MUST PAUSE AND THE PAUSE IS DUE DIRECTLY TO THOUGHT. IN THIS PROCESS, WE ARE MERELY LISTENING WITH OUR EYES. Having done that, we will find later than WE CAN SEE WITH OUR BRAIN WHAT WE LISTENED TO WITH OUR EYES, BUT, the value of these recurrent mental images will be a direct result of how accurately we have observed the original fact.

"The three points of observation clearly show the difference between looking at a thing and truly observing it.

"It should be interesting to know just how many of the readers of this article know exactly what an American flag looks like. You say,

'Certainly, I can describe it--I've seen it thousands of times, white and red stripes, blue field, stars. . .' But try to paint one or to make one from required material. How many short red stripes? How many long red stripes? How many long white stripes? How many short white stripes? Is the bottom edge red or white? Is the top edge red or white? How far down does the blue field extend? Now let's see if you will not say, 'I think I had better go look at the flag'.

"Previously, when we had looked at the flag, lights and shades caused certain chemical changes which in turn set up rod and cone excitement. This was carried back to the extremity of the optic nerve pathway and that's as far as it went. Now, we pick up that flag and truly observe it. We carry the fact to a distinctly additional point. We observe four short red stripes, three short white stripes, three long red stripes, three long white stripes; the bottom edge is red, the top edge is red; the blue field extends down to the lower edge of the fourth red stripe. There are six vertical rows of stars, and eight horizontal--forty-eight stars. Now we have done something distinctly additional. We have consciously carried those facts from the visual area up and forward to the third point of comprehension and fastened them in the very center of our intelligence. Having done that, most likely they will stay there.

"Then we lay aside the flag and recall its appearance with our eyes closed and we are simply calling out of storage, sensation impressions placed there by conscious observation and reflecting them in reverse direction once again on the visual area. In this way, we see the relation of good perception to good judgment, for judgment is based on perception and true perception cannot be defined as the immediate response to a momentary experience for that experience must be merged into the way in which our organisms have reacted and retained every previous similar and related experience.

"We look at an orange. The stimulus here is a colored circle, but from every previous similar and related experience, there arises memory clues for interpreting the fresh experience, so that we do not have to tear the orange to pieces in order to know its taste, touch, smell, and internal appearance.

"In this way, we see to what extent visual accuracy and memory of it can mold our judgment amid new surroundings. For the stock of impressions with which our mind is built up, and with which we do our thinking, forms our conclusions and conducts our lives. Some are foggy, some are clear, but all are a direct result of how accurate has been our perception of them."

Isn't that a fine expression--"we are merely listening with our eyes"?

With this in mind let us try to test each other for reading speed, fixations and regressions. I have here a number of cards so that one person may read, while another observes. By the time the reader has completed five lines, most of you will be sufficiently acquainted with

the eye movements of your subject to count the stops accurately. There will be few stops and few have any regressions in such a group as this. With a child, however, the case would be different. When he comes to a word not in his vocabulary, he will stumble on it, look back to see if there is a clue in the preceding words, perhaps even look ahead to determine if the sentence has meaning without that word. Thus he may fix and regress all over the text. One of the great values of teaching paragraph or "thought content reading" is that there will be fewer fixations, stops and regressions. Remember each stop costs effort and requires a certain amount of energy.

May I say that to my mind fatigue, or tiredness, are of the higher brain centers, and not of the nerves and muscles which are in use. Fatigue is where the sense is, rather than muscles or conducting nerves. Stops, fixations, regressions and the mechanics of reading are for the purpose of conveying information to the mind--the point where fatigue and learning both take place. Hence, the reader who uses many fixations tires quickly, does not remember well, and may need to struggle through the same thought several times in order to "get it". You must look out, however, to avoid confusing cause and effect here. Are these stops, fixations and regressions the cause of the fatigue, or are they outward manifestations of handicaps? Optometrists, who have trained themselves in this work, are teaching patients to make fewer stops and regressions. It is our work to be certain that there are no physiological handicaps present in the child. We think also that we are "training eye movements", but I sometimes wonder whether either optometrist or teacher knows exactly what they do when they get certain results.

The following quotation is from a report to members of The American Research Council of Optometry by Dr. George Parkins, who, to my way of thinking, has done some of the finest work in increasing reading speed. His report started with a list of the number of students, the types of abnormalities, ages, health, etc. I am merely giving you his report of the results obtained;

"As mentioned before, the average reading rate was 208 words per minute. This was increased to an average of 330 words or 122 words average gain.

"Individually, the students gained from 25 words per minute to 520 words per minute.

"The Comprehension increased to an average of 99 per cent, a net gain of 36 per cent.

"Individually, the gains ranged from zero with those students who came in with perfect comprehension to as much as 95 per cent for those students who came in with zero comprehension.

"The fixations were reduced in number from the average of 6.3 to an average of 3.8.

"The Regressions were reduced from an average of 1.7 per line to just an occasional regression.

"The zone of perception was increased from an average of 35 mm to an average of 54 mm. Probably this increase would have been larger if we had been expecting such large increases and had provided the means of measuring. 75 mm was the largest measure available. The zones individually ranged from 26 mm to OVER 75 mm."

There is no doubt that the results are as recorded. Were they because of the instruments used and the technique employed, or were these results secured because of the attention to and the teaching of the things needed to be done to make these students efficient readers?

Dr. Spencer has asked that I try to correlate the mechanical approach to the reader problem with the mental approach used by the teacher. This I have found hard to do. In fact I am not clear in my own mind as to the correct answer to this problem.

We observe the eye movements of hundreds of children and it has become a habit with me to deduce from these eye movements the answer to the individual problem. While a child reads a card of 150 words within his vocabulary age, I can tell from the fixations and regressions whether the problem is mental or physical or a combination of the two, but how I do it is most difficult to explain.

The first observation I make is with the "push-up test". A letter about 5 mm in height is held at 16" from the eyes and the child is asked to "fix" the letter as it is brought closely toward the eyes. At some certain point between 16" and 1" from the bridge of the nose, either one or the other eye is likely to let go and diverge. The normal condition is the ability to hold both eyes in fixation up to 3" from the nose, and then we expect the report "now I see two letters", as the non-dominant eye lets go, or, of course, if a condition of suppression or suppression exists, the subject will report a continuous seeing of one letter, but the non-dominant eye is seeing nothing.

If one eye lets go at about 7" and there is no report of 2 images, we realize at once that the functions of convergence, fixation and in-turning are poor. This will be a key to poor focus-fixation, one eye better than the other, lack of team work, etc.

Your next observation is to move a letter, held at 16" from the eyes, first in a circular movement and then in a figure 8 movement. You watch the student's eyes as they follow the target. Conjugate eye movements should be smooth, but when you see a child cutting corners you recognize a limitation of what we call rotations, and more than likely you will find you have a "head turner" instead of an "eye turner". Wavering, jerking, or cutting corners in following movements on the target indicate lack of the primary skills of fixation, unification and focus-triangulation team work. Before this child can accomplish efficient reading, with high comprehension, these primary skills must be established, otherwise the task involved in this child's reading

one page will be equal to the energy put forth by a normal child in several pages. When the reading is done on the conscious level instead of on the unconscious, a reduced portion of consciousness is available for learning.

In giving a student a card on which you measure the reading speed, you count the stops and regressions, seeking to understand their significance. In the sentence "Patty and Fatty were good little dogs"; if the word "Patty" calls up a familiar image, the eyes point, note and the mind absorb the word with one fixation and then move on to "and", which is an easy word, if the child already has it in its vocabulary. "Fatty" is taken in stride, but the word "were" causes a stumble. His eyes "feel the words as queer, and his mind listens", but to no avail. He has either never seen the word, or does not remember it. He looks back--a regression. He looks forward and gets no clue as to the meaning of this strange word, so he comes back to it to study it. He may make 2 or 3 such regressions before he gives up. Who can answer this: if he looks back 4 or 5 times, is it because he is stupid, or simply persistent, and refuses to give up?

Here is a clue: When a child is compelled to "feel and listen with his eyes" to words, you are sure he should know, when he stares at it fixedly and seems to be hypnotized--yet no recognition comes, then that child has a vocabulary problem, regardless of his visual condition.

When the subject matter is within his vocabulary limits, and you note frowning, lid compression, head turning for better light or focus, "tromboning" the card for better distance, and a general air of vexation and uncertainty, you are observing visual disturbances.

There is an immeasurable distance between the two approaches. You must, however, be on guard, as you may face a combination of the 2 difficulties. In this case a functional examination by the optometrist is necessary.

As you give these reading tests--as you study eye movements, you will find many interesting conditions, each with its own meaning. For example, the "deeper" the word, and the greater desire to fix it in memory, the slower the reading speed, and the more stops and regressions. A long stop may be made to picture the significance of a given word. There may be a long regression, as the reader "ties in" a previous idea with the present one. Tests in reading speed are not valid unless followed by a comprehension test. A patient recently read at 380 words a minute with an absolute zero of comprehension. Obviously, reading speed is but one part of the desired objective. Each stop should bring intelligent recognition of one or more words. The ability to do this can very well be measured by a diagram such as follows:--

DOG

THE DOG

THE DOG RAN

THE DOG RAN AFTER

THE DOG RAN AFTER THE

THE DOG RAN AFTER THE CAT

THE DOG RAN AFTER THE CAT AND

THE DOG RAN AFTER THE CAT AND CAUGHT

THE DOG RAN AFTER THE CAT AND CAUGHT IT

Look at the letter "o" in dog and determine the ability to see three letters, then look between the word "the" and "dog", etc.

This capacity to fix a number of words in one "eyeful" is called the zone of perception. The fovea centralis is too small to take in more than a 3 to 5 letter word and yet, by experience, we discover this zone of perception can be increased by training. In optometry we have ways of stimulating the area around the maculae, until the zone of perception increases to the apparent personal limit of the individual. The widest zone I personally have tested, was 72 mm, just short of 3".

Here is the baffling part of this training. Who trained those naturally fast readers, who had never even heard of zones of perception? How did they learn to take great "eyefuls"?

An interesting example of this circumstance comes to my mind. Two brothers, 17 and 19, were referred to me for visual service. The younger was in his freshman year at U.C.L.A.; the older was a sophomore. The younger had a zone of perception of 47 mm and read 340 words a minute, while his older brother, had a zone of 59 mm but read at a speed of 110 words. Both have perfect visual functions. I tried an experiment with the older boy. It took an entire evening to cover the ground so that he understood how, and why, he should absorb a complete idea from a line of type instead of deciphering the words as he went along. I taught him the value of his wide zone of perception, and how to use it. First I made him read 2 words per stop, then 3, and finally had him working at the rate of 4 words per "eyeful". A progress report at the end of three weeks, reading unfamiliar material from a biology text, showed a reading speed of 275 words per minute with 90 per cent comprehension. Can you see the tremendous advantage gained by this young man during the remainder of his school work?

I asked his younger brother, "Where and how did you ever learn to stop only three times on a line and read so fast?" He had no idea at all. His response was, "It just seemed the natural thing to do. I am a rotten speller, but I know what a word means by the looks of it."

Readers of my generation were taught to decipher instead of read. You are familiar, of course, with the laborious process of spelling out words. To make matters worse, a pointer was used to be sure we fixed each word singly, thus making certain we would be 5 to 8 stop-per-line-readers. This was my own average when I took up speed reading. My fiction reading speed is now over 400 words per minute and my fixations are 2 or 3 to the line. My zone of perception is 48 mm. I have increased it 19 mm by trying to take in a greater number of words per stop, and all this without the aid of optometric training. When I feel that my limit has been reached by this method, it is my intention to go through an extensive training course in the mechanical approach to the problem. It should be noted, to be sure, that my own visual mechanism has been corrected. It seems to me that both the physiological and mental approaches to the training of sound reading habits, must be used. You already know that reading is taught phonetically; this presupposes a widened zone of perception. How do you know, even in college students, that the physical limits of perception are wide enough to encompass more than a three or four letter word per look? Assume an assignment of 500 pages of college work. Consider the difference in the time limit alone, between an average 3 stop and an average 8 stop per line reader. The strange element is that the 500 word per minute reader will many times pass a better comprehension test than the wary, plodding 100 word per minute reader.

Is it not true that the subject matter to be covered in our schools is too important to allow it to be placed on the mercy of time-wasting energy-wasting visual inefficiency? Is not the problem of the educator today great enough in itself, without the hazard of a student body entrained in inefficient reading habits? You have your work to do in discovering, as early as possible, the child with a visual problem. We optometrists have ours in taking that child, readapting his visual apparatus to the task he has to do, and returning him to you capable of carrying the load you must place on him. Teachers and optometrists must work hand in hand unselfishly for the benefit of the children of this country.

PHYSICAL FACTORS INFLUENCING EDUCATION

Charles LeRoy Lowman, M.D.

Founder, Orthopaedic Hospital, Los Angeles

Physical factors influence education to a much larger degree than is generally realized. It should be remembered that growth is work and that a fatigued child's brain does not have enough energy to carry on mental work properly. A normal range of continuing activities should not be expected from pupils who have physical deficiencies such as poor posture, flat feet, glandular imbalances or toxic processes (including tonsils, teeth, kidneys or chronic fatigue). Every teacher should understand something of the physical condition of the children under her care and be able to evaluate inherent differences of type.

There are three general types of people--and of pupils--those of lithe, stout and medium types. Those of the lithe type, who represent about 50 percent of our school children, are slender with long bones, narrow faces, eyes set close together. They are built for speed, are always on the go; are good starters and poor finishers. They are apt to have poor posture, and do not have the endurance for heavy manual labor. Sometimes designated as "carnivorous", they are alert, fast, with tense musculature, adrenalin easily available, thyroid over-active. The pioneers were of the lithe type. Reformers too are usually of this type.

School children of this build are harmed by excess work and play, and teachers should attempt to slow them down. They often suffer from malnutrition and are inclined not to eat enough. Their body chemistry is wrong or easily disturbed. More can be accomplished with them by rest than by activities. Milk should be given freely, and orange juice given for the vitamin content as well as the alkaline reaction. Children of this type have a very high oxidation rate and are apt to run on too low an alkaline reserve.

The stout type, who comprise about 35 per cent of our children, have heavy vertebrae, thicker and shorter long bones and heavy muscles. They are slower--mentally and physically--and are slow oxidizers--hence their obesity. They are organically different from the lithe type (there is five feet less bowel in the lithe). Because they need a high proteid diet the stout type have been called "herbivorous". They are never contortionists, since they are not supple. They are not so liable to respiratory involvement as the lithe type, due to their broader nasal chambers and deeper chests. They usually have good analytical brains, but are inclined to be slow. Once they have mastered a subject they can retain the knowledge learned. They are slow to have hurt feelings, being less emotional and neurotic generally than the slender. They like good eating and living; are genial and easy-going, good mixers and socially congenial.

A fat boy should not be handled like a thin one any more than a high strung trotting horse should be treated like a slow draft animal. The fat child's diet usually needs to be modified, and attention given to his glandular system if his reactions are to be speeded up.

Hearty sympathy is needed for the fat child. A few years ago I saw a boy in Glendora who weighed 165 pounds, was so fat that his development resembled that of a girl. He cried and hid himself if teased; was not at all adjusted socially. Dr. Clifford Wright reduced him 35 pounds in the first three months of treatment. After receiving pituitary extract he soon straightened out and developed into a real boy. His masculinity developed, he advanced mentally, and he was not only accepted in his school group but became a leader.

The medium type, which comprises about 15 per cent of our children, are generally medium in build, have good health, good mental reactions. They are well poised, being better balanced mentally, physically and organically than those of either of the extreme types.

Beside the differences of type, teachers should also give attention to the frequently large differences between physiological age and chronological age. A young girl who had been brought up in the Hawaiian Islands was brought to me several years ago, when she began to develop serious behavior faults. Her social adjustments were those of an eight year old; her emotional cravings those of a girl of eighteen. The entire development was spotty. Her menses had begun at ten years of age and she had an I.Q. of 128. Upon examination it was found that she did not have enough lime in her body and that her vertebrae were crushing down, causing a round back deformity. She was put in a back brace for two years, was given correct diet to develop her bones properly, and made rapid progress toward a more level development.

A Mexican child with spastic paralysis, who drooled and looked like a completely hopeless idiot, came to me. His paralytic deformity was corrected, and later, when he was able to stand the operation, his tonsils were taken out. He was treated for glandular imbalance and his I. Q. improved to about 90. Although previously graded feeble minded, with suitable treatment he has been able to go through high school, find a job and take care of himself.

In the present school system all too many children are ground through the same mill regardless of whether they are receiving what they need to develop them properly. Questions of health and hygiene are slid over. Individual teachers are prone to think that their own subjects are of supreme importance regardless of the child's interests.

As we all know, when the threshold of resistance is lowered, attention is captured. Yet in our school system pupils are penalized when interest in particular subject matter is lacking. It is impossible for the average child to feel and show interest in many subjects at the same time. If a boy is keen about geometry, give

him geometry. Capitalize the interest when it is there; let work in English or the other studies ease off for the time.

My boy, for example, became interested in chemistry. With money he earned he bought a microscope, and along with a friend who had some equipment, set up a basement laboratory. They evaporated mixtures to make crystals, then observed them through their microscope. Working together they learned more of chemistry in a short time than they would have gained in a year of study at school.

"Learn by doing",--there never was a truer idea than this. There is very little, if any, purely abstract, purely mental work. Youngsters have to express themselves with certain types of outward expression. As Stanley Hall said, "There is no emotion without motion."

Teachers should realize that a high alkaline reserve is necessary; that the blood should be alkaline in character; that all fatigue stuffs are acid poisons; and that acidosis is usually caused by fatigue. They should not forget that the number of bowel movements a child has each day is important, since retention of toxins makes him sluggish and irritable. If a child's glandular mechanism is out of balance corrective steps should be taken.

Teachers should confer as to the load suitable for each individual child to carry and be guided by reports from physical education and health services. Problem cases should be given light loads, perhaps even an extra year, if they are to progress. In short, teachers must make every class an opportunity class by giving due appreciation of physiological factors as conditioning educational results if the children in their care are to reap present and future benefits.

A demonstration of postural faults, by slides from the studio of the Orthopaedic Hospital of Los Angeles, followed.

THE ADMINISTRATION OF REMEDIAL READING IN THE PUBLIC SCHOOLS

Marion Menroe, Ph.D., Specialist in Remedial Instruction
Pittsburgh Public Schools

During the past ten or fifteen years there has been an increasing interest in the establishment of "reading clinics" and the administration of remedial reading programs in the public schools. Among the reasons for this growing interest may be mentioned the following:

First: The number of children who need remedial instruction in reading composes a fairly large percentage of the school population. Surveys of reading failures indicate that from about ten to twelve per cent of the general school population has failed to make normal progress in learning to read. This percentage means that every school of 500 children would contain about 50 or 60 children who need remedial work in reading.

Second: The importance of reading in the school curriculum has also served to focus the attention of educators on these factors which impede reading. A child who fails to learn to read is usually blocked at successive stages of educational progress. Teachers of Junior and Senior High Schools frequently assert with justification that much of their effort must be spent in attempts to teach their students to read before they can proceed with the content of high school subjects. Such assertions naturally serve as a challenge to teachers of reading and emphasize the importance of diagnostic and remedial instruction.

Third: The changing emphasis in education toward personality and behavior as the goals of education has also brought attention to the importance of removing those factors which lead to educational maladjustment. Educational procedures are now being judged by the way they influence the behavior and feelings of children. Children who fail at school suffer a deprivation which frequently brings about undesirable behavior. On the other hand, successful remedial instruction which removes the causes of failure frequently relieves the child of a major conflict and results in improved behavior. The studies concerning the relationship of school failure to personality disturbance have given emphasis to the importance of remedial reading as a therapeutic technique, in cases where reading disabilities are accompanied by behavior disorders. Remedial reading often serves as a successful initial training for teachers in methods of mental hygiene. As the teacher observes the improvement in the child's behavior which follows the solution of his educational conflict, she also begins to search for other conflicts which underlie other types of undesirable behavior. Former concepts of punishment and discipline for misdemeanors become replaced by concepts of understanding and adjustment. Irritation and annoyance at petty instances of bad behavior give way to tolerance, sympathy and insight. Mass instruction is modified by adaptation of methods to individuals. Children are being taught rather than subject matter.

Because of these reasons, educators are now convinced of the importance of remedial reading programs and are searching for successful ways of administering such programs. The public schools of Pittsburgh, Pennsylvania, have taken definite steps toward the solution of their reading problems, as will be described in the remainder of this paper. There are three parts or aspects of the remedial reading program in Pittsburgh: (1) the reading clinic for diagnosis of severe disabilities; (2) remedial group instruction for correcting milder reading problems, and (3) the prevention of reading disabilities by early diagnosis and treatment in first grades.

The reading clinic: The reading clinic meets one day each week. It is a cooperative service in which the school medical examiner, the school psychologists, a psychiatrist, and the supervisors of reading combine their skills in attempting to solve each child's reading problem. The aims of the clinic are as follows:

1. To provide a diagnostic center to which severe reading problems may be referred.
2. To combine psychological, psychiatric, physical and social data for a better understanding of the whole child.
3. To acquaint principals and teachers with methods of case analysis through the clinic staff meetings.
4. To make helpful suggestions for the solution of each child's problems in the light of his physical, mental, emotional, and educational needs.

The steps of procedure are as follows:

1. The child is referred to the clinic by his principal who gives the school history and contacts the parents in order to obtain their consent and cooperation in the clinic study.
2. The child, if accepted for study, is given an appointment for examination. Usually two mornings are required to complete the necessary tests which include physical and mental examinations, tests of vision and hearing, photographs of eye movements during reading and other diagnostic reading tests.
3. The parents are interviewed in order to obtain the child's personal history and to discover family attitudes which may assist in understanding the child's problems.
4. A clinic staff meeting is held to which are invited the clinic examiners, the principal, teacher and the reading supervisors. At the staff meeting
 - a. the findings of each examination are reviewed by the examiners.
 - b. the probable causes of the reading difficulty are summarized.
 - c. remedial procedures are suggested.
 - d. suitable plans for the child at school are worked out in discussion with the principal and teacher.
5. The school is visited soon after the staff meeting by the reading supervisor who demonstrates remedial techniques and assists the teacher.
6. The child is retested at the clinic after a suitable period of time to evaluate and measure results of treatment.

During the course of a school year, the reading clinic is able to examine about one hundred cases. These are limited to the most severe disabilities and are selected as widely as possible from the various schools in order to enable each school to have contact with the clinic. The clinic cannot, however, examine every child in the schools who needs remedial instruction.

Remedial reading groups: Fortunately not all children who are retarded in reading present serious clinic problems. Many have mild disabilities which give way readily to such diagnosis and treatment as can be given by a classroom teacher who has received some training in remedial work. The second part of the general remedial program consists of assisting and training teachers to work with groups of poor readers. The aims of this work are as follows:

1. To assist the teachers in selecting and grouping poor readers for effective remedial instruction.
2. To train teachers in remedial methods.
3. To assist principals in administering the remedial programs.
4. To measure results of treatment after suitable intervals.

The procedures in this program are as follows:

1. The teachers and principals make a list of their poor readers on the basis of classroom observation and achievement tests.
2. Candidates for remedial work are given diagnostic tests to determine types of errors and the nature of their reading difficulties. Case studies are made by teachers after obtaining data from intelligence and physical examinations given at school.
3. Children are grouped for remedial work on the basis of similar needs.
4. A remedial program is instituted, following one of the following plans or a variation thereof:
 - a. Remedial Home Room Plan: The school is re-organized to free one teacher for remedial work. She is placed in charge of a specially equipped room. All the poor readers from the lower grades spend the mornings in this room. The poor readers from the upper grades spend the afternoons in this room. The pupils return to their various classes during the other half of the day.
 - b. Remedial Teacher Plan: One teacher in a building is selected and relieved of her other work by re-division of the teaching load of the building. The remedial teacher then meets groups of poor readers in "reading clubs" of from eight to ten children. The time of the club meetings is arranged so that a child does not miss the same class of his regular schedule each day.
 - c. Remedial Period Plan: The morning periods are each shortened by five minutes. This produces a period of twenty-five minutes which is devoted to remedial work. Each teacher works with a "reading club", selected for similarity of difficulties. Pupils not in the reading clubs have free periods for work in library, music room, or in other worthwhile activities.

- d. Remedial Reading Class Plan: Occasionally an entire class measures below grade in reading. This entire class becomes a remedial class and receives remedial instruction instead of the usual reading program.

These four plans are all effective in a large number of cases. Whenever a child does not respond by improvement in reading after a semester in a remedial reading group, he may be referred to the reading clinic for a more thorough diagnosis than can be given by the classroom teacher.

Preventive Work in First Grades: No remedial program in complete without an attempt to prevent the development of reading disabilities. A definite part of the Pittsburgh program is devoted to preventive work at the first grade level. This work has the following aims:

1. To discover children who are likely to fail before they have actually failed.
2. To adapt instruction to these individuals in such a way as to prevent their failure in reading.
3. To devise methods of measuring and developing reading readiness in those children who are immature for reading.

The procedures used in the first grade programs are as follows:

1. All first grade entrants are given intelligence tests and reading aptitude tests. On the basis of these tests the children are grouped for instruction. Usually three groups of children are found:
 - a. Children who are high in both mental age and reading aptitude scores. These children are considered to be "ready" for reading.
 - b. Children who are low in either mental age or reading aptitude but not in both. These children may need special help in learning to read.
 - c. Children who are low in both mental age and reading aptitudes. These children are considered as too immature for reading. Instead of formal instruction in reading, they are given special work designed for developing reading readiness. This work consists of games and exercises in language, visual and auditory discriminations, articulation and motor control.

These three aspects of the remedial reading program, the reading clinic, the remedial group work, and the preventive first grade program, are, at present, each equally important. No thoroughgoing remedial program can be complete without these three parts or aspects of the work. Gradually, as the preventive program proves effective, it will lighten the load of the other two phases of the work and assume a position of greatest importance. Many reading disabilities become severe primarily because of long-time neglect during which unfortunate and negative attitudes toward reading are fixed. With increasing attention to early diagnosis and treatment, certainly a large group of the milder disabilities could be prevented and never come to remedial treatment.

VISUAL AIDS IN THE PROGRESSIVE READING PROGRAM

Fred. W. Orth, Principal,
Virginia Road School, Los Angeles

It is said with much truth that reading is the most important tool-subject in the curriculum, also that it is the most difficult to teach. Modern teaching procedures which include the improved use of devices long known to us have lessened the burden of the teaching of this important subject resulting in its more rapid mastery on the part of the learner.

The use of visual aids in the teaching of reading in the elementary grades has made possible a wealth of vicarious experiences with which to prepare a suitable soil for context reading. In the teaching of reading it is well to take some of the following factors into account and be guided in the choice of teaching aids, visual or otherwise.

1. Small children are most interested in things in the immediate surroundings, themselves, parents, school, toys, pets, etc.
2. Play activity is the strongest motivating medium through which children express themselves.
3. Pleasurable emotions must accompany the building of memory reading.
4. Little children enjoy repetition of incident, and few characters in their play and in their stories.

In the teaching of reading in the first grade we depend almost entirely at first upon activity projects. Reading for the purpose of gaining information, it appears to me, follows at a later period. Thus the action may visualize stories already a part of the child's experience such as Little Black Sambo, Peter Rabbit, The Three Bears, Cinderella, or Hansel and Gretel, and with which most children are familiar. As a visual aid to reading, puppets may be said to do the same thing for the story that actors do for the written play. They visualize action.

An experiment with puppets has been recently made in a first grade where the age level of mental maturity was well below seventy-six months. It was thought wise to delay actual formal reading for the first few months. The children were first made aware of the possibilities for reading experience, and its need. The activities were visualized by the use of a boy puppet, Jack, and a girl puppet, Jane, who were dressed to represent children of the same age and background as the children in this class. Jack and Jane (and also their dog, Terry, and a small black kitty) were the puppets through which these children projected their own personalities; also their thoughts and experiences in the dramatization of their own everyday living.

Construction of stage sets and scenery, sewing, creative art, dramatization were other outcomes which followed the use of puppets as visual aids to reading in this particular grade. The seat work silent reading periods, and drills were also based upon the reading units centered about the activity of the puppets.

A very necessary part in the teaching of reading in the Primary grades is the building of vocabulary, and here we must draw heavily on visual aids. Study prints, lantern slides, and still films depicting objects, scenes and related experiences in connection with the children's home life, the community activities all about them, nature study, and all forms of transportation, are only a few of the valuable visual aids we can employ.

Another visual aid the subject matter of which is entirely devoted to children's games as played and enjoyed by other children, provides much stimulation for class discussion and finally reading. (A motion picture demonstration will be presented to bear out this point.)

For little children, nothing is more beneficial than the excursion as a visual aid to reading vocabulary. In this way the child's knowledge of his immediate environment may be crystallized into reading experience. When the excursion is no longer possible or practical, the motion picture becomes the ideal substitute in the teaching of reading, since through that medium it is at once possible to provide experiences outside the immediate environment.

Visual education is a term which is applied to a large variety of teaching devices which function mainly through the sense of sight. It is not a method of instruction in and of itself, but coordinates with all subjects. Teachers of reading often find it valuable to use many or all of the following major visual aids during the course of their numerous activities.

1. Study prints or flat pictures. For individual study and analysis. They are cheap and abundant, durable, light in weight, inexpensive, and easily transported. They excel for close range examination.
2. Lantern slides and still films. Provide best visual aids for group instruction through discussion and analysis. Produce artistic effects in color, line, and form. One profits here by projection, which compels attention, by semi-darkness, which excludes distractions, and by an enlarged picture which produces an illusion of reality. They make possible a minute study by all of the material reproduced.
3. Stereograph. With its three dimension effect, it is especially valuable for group work and for examination of scenes involving intricate construction.
4. Objects, specimens and models. These aids present three dimension space and relative size in a most effective way.
5. Excursion. A cooperative enterprise shewing phenomena in their natural setting. Shows three dimension, color, qualities, motion, etc. Offers opportunities for socializing instruction and blending school activities with community life.
6. Exhibit. Excellent from research point of view. Especially valuable for introducing a subject.
7. Sand table. Like the model, it represents three dimension space and relative size in a most effective way, giving a meaningful interpretation to situations often difficult to understand. Shows phenomena in their natural setting, but in miniature. Gives opportunity to illustrate and emphasize various features of the daily lesson and affords children the opportunity to express their ideas.

8. Motion picture. Has unique advantage of depicting action or behavior with its irresistible illusion of life and reality. Especially useful in showing activity which no other pictorial aid can actually portray. It provides experiences which cannot be brought to us in any other way and emphasizes the necessity for continuity and close sequence of events.

The value of visual aids lies in their conjunctive use and not in the isolated use of any one form. To be most effective, each aid must make its unique contribution toward the total whole.

THE ENDOCRINE GLANDS AS RELATED TO MENTAL AND PHYSICAL DEVELOPMENT

E. Kost Shelton, M.D., Associate Professor of Medicine,
University of Southern California; Head, Shelton Clinic,
Los Angeles and Santa Barbara

In the process of growth and development, the internal secretions or hormones liberated by the endocrine glands, act in much the same capacity as skilled artisans during the construction of a mansion. If one had to occupy a large home from the time of the erection of the super structure much as man must occupy his temporal home or body long before it is completed, he would need not only skilled artisans to finish the structural work, namely, carry out the original design, but someone to help him maintain and keep his house in order. In the human economy the same influence which builds the house also keeps it in order. I should say, that is what happens in the normal. In the disordered individual, that is, one with a metabolic imbalance or glandular disorder, it is quite different.

The pituitary gland lying at the base of the brain is the master craftsman and major-domo of our temporal house and has direct control over almost every other physiologic function of the body. This amazing structure, no larger than a good sized bean, manufactures at least twelve active principals, each having a specific duty to perform. One of these has to do with the process of growth, another with the development and function of the thyroid, still another with the development and function of the adrenal glands. The fourth, fifth and sixth influences are calcium, fat and sugar metabolism respectively. Aside from these, there are three distinct sex fractions liberated from the pituitary, one which controls the development and function of the sex glands, one which contracts the uterus during labor, and still another whose duty it is to produce milk at the proper time. There are still others which influence blood pressure, water storage, smooth muscle contraction, and even pigmentation. It may readily be seen that disturbance of this structure has far-reaching influences on the body economy.

Among the most important clinical problems of pituitary origin affecting children of school age are the fat children, the excessively tall, or dwarfish children, those with a tendency toward sex reversal, or underdeveloped reproductive organs. Most of these children do not have primary disturbance of the central nervous system and are therefore of average or even of superior intelligence. However, the patterns of behavior developed around their feelings of inferiority frequently defeat them in school and sometimes throughout life. They deserve, at least, to be understood.

The thyroid gland controls the development of the body, particularly that of the bony framework and the central nervous system. Thyroid disease is handed down from generation to generation if uncorrected and is bound to show its mark upon the physical and mental makeup of the child. Except in severe states of thyroid insufficiency, as classical cretinism, this condition is the easiest detected and the easiest corrected of all glandular disorders.

Parathyroid disease manifests itself in the child by an extremely unruly and irritable nervous system or a malformed framework. Many behavioristic problems may be directly traced to either an inadequate calcium supply or improper utilization of calcium and phosphorus by dysfunction of the parathyroid glands.

The adrenal glands have much to do with the energy status of the body, hair growth, the dominance of sex, and possibly allergy. One portion of these glands is essential to life, another has to do with the defense mechanism of the body.

The pancreas plays a leading role in sugar metabolism and since the balance of sugar in the blood, liver, muscles, and brain is essential to every thought and every action, one need have little imagination in sensing its importance in the body economy. Many children have difficulty in school because of pancreatic disturbance or of irrational carbohydrate feeding.

The male and female gonads (testes and ovaries) have far-reaching influences on the configuration and the pattern of behavior.

There are other and lesser secreting structures such as the pineal and thymus glands having definite effects upon the body economy but of no great present clinical importance.

READING PROGRAM OF THE COMPTON UNION JUNIOR HIGH SCHOOL

Mrs. Ethelyn Yount Weida, Chairman of Remedial Reading Groups,
Compton Secondary School District

When the secretary of this conference asked me to tell you of the reading experiences of our district during the past year my first thought was, Is it possible that what we have been doing is interesting enough to present to such an august assembly? I did not consent until Miss Hovious assured me she felt that we had been doing some few things at least that were in the right direction in this matter of the improvement of reading.

For the past year I have been chairman of the Remedial Reading Curriculum Committee of the Compton Union Secondary School. In the system there are five junior high schools with a continuous enrollment of 3,000 pupils, and a continuous 7th grade enrollment of 890 pupils. We have no special supervisory staff and the Curriculum Committee serves to keep the work of the five schools somewhat uniform.

I am going to tell you as exactly as I can remember how we began our reading work. Last summer I would have given a good bit to have talked with someone who had started a reading program in a modest way. You read and hear about these wonderfully expensive machines you can use, and the tests you can give, and the beautifully bound books that the children may read, but when you must make your program function out of little or nothing these reports just do not seem to apply to your case.

Our committee met last year on the average of twice a month at 3:30. At the invitation of Mr. Hemphill the principals attended our first meeting as well as the teachers. This was an opportunity for the administrators to learn the details of the plans for the year. Much interest was shown in this committee throughout the entire year. Scarcely a meeting was held without several administrators being in attendance. Undoubtedly our success in the improvement of reading, which will be shown by charts later, is due to the fine cooperation the administrators gave the teachers.

Ever since our junior high schools came into existence the entering 7th graders have been given the Stanford Achievement test. This was the starting point for the Reading Committee. In fact for a time it looked as if it might be the termination point too. By this time certain monies that were to be spent for books and tests were withdrawn from the funds of the district and we were left "high and dry" to teach our remedial reading classes without adequate materials. Compton is in that district where much money has been spent to make its school buildings quake proof.

When the Stanford Achievement tests were about corrected our group met for its first discussion of reading. It proved to be a meeting of confession as well. Several of the teachers expressed fear and almost panic at teaching anything so complicated as reading. Only a few of the group had taught in the elementary school, and the remainder had always taken it for granted that children knew how to read by the time they entered the junior high school. You all know that this attitude is a common fallacy.

Our corrected Stanford tests, that is, the reading section, showed that between 50 to 60 per cent of the pupils in the 7th grade of our district fell below the 7th grade in reading ability. However, this knowledge did not help us to find the phases of reading in which the pupil was competent or weak. Since the Iowa Every Pupil Test seemed to have high diagnostic possibilities we ordered these to help us determine our deficiencies. I want to state our reactions to this test. Iowa youngsters must be better readers than California children. Though the Iowa Every Pupil Test is for grades 6, 7 and 8, we felt it far too difficult to test accurately our deficiencies.

Later on with the budget somewhat relieved and with the second semester in sight we ordered "The Iowa Silent Reading Test" by Greene and Kelley in place of the Iowa Every Pupil Test. We have all liked this test exceptionally well and feel it is a great aid in helping us analyze our reading difficulties.

A few days after this first meeting I issued a bulletin. I recognized that our committee needed a common understanding of the problems in reading. As a group we needed training in this special field. Without materials of any sort I adopted this method. Following is the text of the bulletin:

"TO THE MEMBERS OF THE REMEDIAL READING CURRICULUM COMMITTEE

"Reports at our first Remedial Reading meeting show that most of the junior high schools have completed the Standard Achievement test. Diagnostic tests are the next implement we need. Mr. Hemphill is sending for the Iowa Every Pupil Test immediately. Until this diagnostic test arrives, will it not be possible for us to use profitably this time with our high remedial groups in the teaching of 'Work with Books'?

"Sixth grades always make poor scores on this type of work. For independent study such information is absolutely essential.

"As we work out lessons on Table of Contents, Index, etc., from our state testbooks, let us type these lessons, and bring them to our next meeting and pool our materials. Five schools each contributing two lessons would add to our store of materials considerably.

"Could one representative or more if possible from each school meet at Lynwood Junior High School, Wednesday, September 30, bringing two types lessons at least. Of course schools who contribute and attend will benefit most from this exchange.

"In the meantime we might review the following books:

1. Gates, Improvement of Reading (Revised Edition)
2. Yoakaa, Reading and Study
3. McCallister, Remedial and Corrective Instruction in Reading.

Ethelyn Yount Weida
Chairman of Committee."

"Work with Books" or "Use of Books" lessons seemed a good point of departure. It was a field that we all seemed to know about. This gave time for the group to study and grow.

With our Standard tests corrected our remedial reading classes were organized. These classes met three times a week in place of a course known as Recreational Reading. It seemed logical to place it here. Below average readers could not enjoy the library. In fact these were the individuals who most often were guilty of causing disturbances. The office had carefully scheduled two 7th grade Recreational Reading classes at the same hour, thus freeing one teacher to instruct a group of poor readers.

First we took those students whose I.Q.'s as measured by Stanford and Terman were 85 or above and whose reading ability was 6th grade or above. Fortunately the larger number of our "below level readers" fell in this class. We hoped by taking these border line cases to raise soon their reading ability to the point that they might finish their 7th grade content subjects successfully. Our group has adopted Dr. Lee's idea as true that "a child will not be successful in junior high school unless his reading ability is at the seventh grade level" and our committee adds "or better".

In the committee meetings that followed we set up such definite helps as this: Where special classes are organized it is most important for the teacher:

1. To make her students aware of their need for self improvement and to help them recognize the value of special instruction.
2. To call the attention of her students to such physical factors as eye movements, lip movements, poor eyesight, etc.
3. To give the students regular practice in rapid silent reading.
4. To call the attention of the pupils to content by
 - a. finding answers to questions
 - b. by outlining, selecting the main thought and details
 - c. by formulating questions
 - d. by using the index table of contents, table of maps, etc., to locate materials and
 - e. by using the dictionary.

But even then with what seemed very definite ideas some of the teachers still seemed uncertain of their procedures.

We had expected to have in the hands of the teacher and pupils Yoakam, Bagley and Knowlton, "Reading to Learn", Books I, II and III, and without a text to follow some teachers are lost.

No books, no materials, have made us prove the truth of the saying, "Necessity is the mother of invention". I searched through the shelves of our book room, finding first of all a beautiful new book, J. Russell Smith, California, Life Resources and Industries, which no teacher checked out. This book has a fair index and the classes liked the material. The print is good. It contains maps and graphs for the teacher to help the students interpret. We had some fine lessons out of this book.

I found three other books that proved invaluable to me during this period. They are not state texts. The general science classes had discontinued the use of them, and these books were on the discard. One of these is Rush and Winslow, *The Science of Things About Us*, 1930. Little, Brown. It has a meager index and cannot be used in lessons on the index but the material in it is fascinating to most boys. The other two books are by William Atherton Du Puy, *Our Plant Friends and Foes*, 1930; and *Our Insect Friends and Foes*, 1925. These last two have no index, but again the material is most interesting. On these books my reading lessons were based for the first semester, and I was glad we had them stowed away in a book room to be dug out.

You may be wondering why the poor readers and therefore most likely poor students could not have brought their social science, or other textbooks, to class. It is most important for the students to see that this special help we are giving applies to all his classes and to all his studies. However, I feel that we should avoid being tutors. We should teach so that techniques will carry over but not teach the social science lesson unless it is for the purpose of illustrating some point but not for regular practice lessons, for instance, marginal headings.

October meetings revealed the fact that the teachers were growing but were still needing help. To give them some understanding of how deficiencies in reading may be detected through oral reading I sent out the following bulletin:

"TO THE REMEDIAL READING CURRICULUM MEMBERS:

"Next meeting date Monday, November 9, 1936. Compton Junior High School, 3:45 P.M.

"Let us have the Iowa Every Pupil Test given by this date, and let us be able to compare the results of this test with the results obtained on the Stanford Achievement. Also be prepared to evaluate critically this test.

"That we all may meet on common ground, let us have our pupils read aloud from a content reader or textbook, not too simple nor too difficult material. Your judgment as to the reading ability of your group will determine the material you select. As the pupils read let us note their deficiencies, not mentally but on paper by some such scheme:

<u>Names</u>	<u>Mispronunciation</u>	<u>Confusion</u>	<u>Poor Word Phrasing</u>	<u>Etc.</u>
	I		I	
		I	I	

"Since we must help our pupils in groups, we will choose for our first remedial lessons those deficiencies which occur most frequently. Before we can teach the materials to meet the deficiencies we must understand the causes of these deficiencies. Mr. Hemphill has promised to order copies of Gates and McCallister for each Junior High School. From these references we will be able to diagnose our deficiencies. By November 9, we should have our deficiencies listed, our deficiencies diagnosed, and then at this meeting we will begin the task of gathering concrete materials and making concrete lessons to relieve these deficiencies.

"I am listing the deficiencies you are likely to discover:

1. Lack of fluency and facility
2. Frequent halts and hesitations
3. Periods of confusion
4. Numerous requests for help
5. Habitual dependence on others
6. Interest in hearing stories told
7. Unable to read anything but simple material
8. Break sentences up without due regard
9. Reads in a stilted manner
10. Mispronunciation
11. Substitutions
12. Words not in test supplied
13. Omission, etc.
14. Lack of interest in reading
15. Cares for only one type
16. Excessive reading
17. Withdraws from other responsibilities or opportunities

"Only two teachers have contributed lessons on the use of books. Would it be possible for all the members of the group to bring their contributions by November 9th? Such lessons may include:

1. Exercises in skimming
 - a. to locate name of a place
 - b. to get the gist of the article
 - c. to make reference lists
2. Exercises in the use of index
 - a. finding page on which material may be found on a given list of word subjects
 - b. underlining word which you would look up first in finding the answers to these questions
3. Exercises in use of dictionary
4. Exercises in use of table of contents
5. Exercises on parts of book

"These are only suggestions; you may have additional ideas. Bring them along.

Ethelyn Yount Weida
Chairman R. R. Curriculum Section."

At the November 9th meeting we discovered that of all the deficiencies noted in our oral reading the most frequent was lack of recognition. The group then selected recognition as the particular unit to stress. We appreciated the fact that none of the reading abilities can ever be isolated, but our emphasis would be placed on recognition as one of the fundamental reading abilities. We arbitrarily chose Dr. Yoakam's divisions of recognition. I also used some lessons based on the J. Russell Smith text. Lessons 1 and 2 illustrate an informal test that a teacher may prepare. Yes and No questions should be used sparsely. Lesson 3 was a lesson on recognition. It involves phonics, the use of the dictionary and the knowledge of the alphabet. Few of the teachers understood phonics. At this point I distributed copies on Phonetic Training, published by the Santa Barbara State College under the direction of Miss Price. Also a digest from Marion Monroe's "Children Who Cannot Read" was given out.

Flash cards helped me in teaching children to recognize words. Following the plan of lesson 3, I had the children list the words which they did not understand and could not pronounce. We worked these out on the blackboard. I then printed the words that caused trouble on cards, and used the cards in review lessons. Authorities seem agreed that poor readers have meager meanings or ideas. I attempted to increase these in this manner when I presented the card. I not only wanted the pupil to pronounce the word "situated" correctly but give another word that meant the same thing, for example, "located" or "set" or "placed". "Hindrance"; after pronouncing this word the pupils reacted thusly, "brick wall", "stop and go signs", etc.

When we came to use the dictionary the ignorance of the alphabet was appalling. I had some pupils who said, "Oh, yes I know the alphabet", and would repeat it in the same fashion as a two or three year old. You could almost hear them conclude the jingle, "Now I've said my A B C's tell me what you think of me". I made a set of flash cards which I use either with individuals or an entire class. Sometimes we name the letter before the one I show and sometimes the letter after. It is only a device, but the pupils soon discover whether they know the alphabet well enough to use a dictionary effectively.

Where a group of teachers are unfamiliar with the techniques involved in the teaching of children to read I think that the quickest and surest method of gaining help is a visit to an expert reading teacher in the 1st, 2nd, 3rd and so on through the upper grades, thus permitting the visiting teachers to see that reading is a continuous process not wholly attainable at the minute the 6th year report card is given out. A chart later will indicate the large amount of overlapping in reading ability in any grade. I believe such visiting days could be inaugurated in many systems with fine results.

However, I do find that in the set-up found in many California communities where the elementary and secondary superintendent is a different individual that there is the possibility that the elementary superintendent may feel that it is a criticism leveled at his system if the students are taught reading in the junior high school. For the sake of the child these misunderstandings should be remedied in order that demonstration

lessons and visiting days may be enjoyed in your own community.

Because of inadequate materials we were not able to compare our results the first semester. However, we gave the Iowa Silent Reading Test to our classes and found some that had ranked below the 7th grade on the Stanford test with a total comprehension score on the Iowa Silent Reading Test of 8th grade and 8th month or 8.8.

Interest in reading is something that cannot be measured easily. I have in mind a girl, that having been discharged from the class as cured, or up to the 7th grade level, begged to return. She would come to me with, "I like to read so much better than I did before I entered the reading class and I read so much thicker books". This girl was transferred to my Recreational Reading Class second semester and to the end of the year she took great pride in showing me how much she had read. None of us can estimate what improvement in techniques and a little encouragement did for this girl in influencing her reading in the future.

We often hear this statement: with improvement in reading there is improvement in conduct. I had this experience with a boy whom I took out of a class to give special instruction in reading. This boy was writing the Constitution for the teacher because he was a behavior problem in the library. Working with him in a smaller class I discovered that his eyesight was poor. On the suggestion that I felt sure his reading and therefore his classwork would improve with the purchase of glasses, he obtained a pair. When shifts were made in classes at the beginning of the second semester I had a class in the library the same period he was there for Recreational Reading. I found him day after day engrossed in a book and as far as I know from that time on he caused no trouble. This indicates that the correction of a reading disability, in this case primarily a vision defect, often results in better educational adjustment. These are only two of the cases that I might cite. Those of us who are teaching reading can give dozens of interesting stories on the improvement of students through both individual and group instruction. From this point on the Remedial Reading group seemed on the upward path.

We already had on hand our diagnostic Iowa Silent Reading Tests to give our classes at the beginning of the second semester. We also had room sets of Yoakam, Bagley and Knowlton, Reading to Learn, Book I, II and III.

When Mr. Hemphill advised us that Dr. Trillingham, of the County offices, had some materials to present to the Reading Committee and to interested members of the English Committee with a view to teaching these materials the second semester, I well remember that several of us wished we might be let alone to pursue our work unhampered.

But we always enjoy Dr. Trillingham's meetings and we went to see what it was all about. Dr. Trillingham made it seem a real favor to have an opportunity to teach this material which he was about to place in our hands. Some of you must have guessed what this material was by now: "Adventuring the Printways" by Miss Carol Hovious. The box of mimeographed

materials so thick and so long was handed me by Mr. Hamphill with the casual remark, "You may read this and present your findings to the Reading Committee the next meeting".

I recall now spending one of those "smudgy" week-ends going over the manuscript. As I was getting this paper together I ran across the notes I had made on the manuscript in January. I couldn't refrain from including the first and last paragraph that I had jotted down to present to the Reading Committee. It was as follows:

(First paragraph): "After reading carefully every word of this manuscript I may be a bit over-enthusiastic and may make it appear as a cure-all for every and any deficiency, but I'm not sure it isn't --it even has a suggestion for an assembly--I think that's quite something to have actual class work function to that extent."

(Last paragraph): "This manuscript is scientific and yet artistic, thoroughly and skillfully planned, well motivated because it is sincere and straightforward in its approach. I want to say that my feeling of the worth of the material increased with usage. The group of teachers who compose the Reading Committee praise it from start to finish. We all regretted that we had only four months to teach the manuscript."

It may appear that I am talking up business for Ginn and Macmillan. I receive no commissions from either of them. I am truly grateful to have such a practical book as Miss Hovious's "Adventuring the Printways" on the market.

Miss Hovious suggested that her mimeographed materials be taught in regular English classes. Approximately 100 eighth grade students, 275 second semester 7th grade students and 90 first semester 7th grade students of the Compton Union Junior High Schools engaged in this experiment. The manual which accompanies this material is most complete and all the teachers followed it closely.

I wish that every teacher might speak for herself. We may not have been a trained group but we were interested from the first and willing to become intelligent about this matter of reading whatever the price. When I show you charts such as these you cannot doubt the interest of a teacher who makes such pieces of art. (Charts by Miss Anderson, Miss Bill and Mrs. Weida were shown.)

I had a class of 42 eighth graders with which I used this material. The following paragraphs contain the experiences I had with this group. First of all, I gave the Iowa Silent Reading Test. I found that as a group they fell lowest in the "location of information". According to reports from seventh grade teachers, their groups fell low in this section too. I knew then that the work given the first semester on index, table of contents, dictionary, etc. had not gone amiss.

Eyes were tested with the Schuellen chart at the beginning of the semester. Children were seated according to these findings. Parents of children whose eyes seemed to need attention were notified. Three pupils obtained glasses in this class.

Peep hole cards were used to make the group conscious of eye movements. A discussion of what they saw followed the use of these cards. Pictures of poor eye movements and good eye movements were shown and interpreted. The children appeared interested in this phase of which they knew absolutely nothing before.

Those individuals who scored as high as 11th grade were excused from much of the daily practice. If a pupil's test showed a particular weakness in the phase then being taught, he was included until that weakness was corrected. Every individual took the test for speed and comprehension at the end of each chapter. I feel, and again its my own personal feeling, that the more charts and graphs that can be introduced to show the pupil his improvement the better.

In the chapter on Headlines, Miss Hovious suggests that the children bring clippings from newspapers, exchange with classmates, write a heading and compare with the original headline. I found that the teacher needs to set up good standards for choosing these paragraphs. The second time the children brought clippings they were of far better quality than the first. The teacher prepared a group of paragraphs and used them with the class. When I felt the class might be slipping with main ideas we would have such a lesson. By passing these out according to a schedule, the same clippings can be used eight times, each student having the opportunity to make five headlines each lesson.

The section on word clues we found most interesting and valuable. As a teacher I wishes we might have had the entire year for this important study of stems, prefixes and suffixes, or word building. Every child supplied himself with index cards, and practically the entire class equipped themselves with complete card files. The interest the children had in finding words with the same prefixes they had studied or with new prefixes never waned. On several occasions I noted students in the midst of a good story jot down a new word to add to his card files. Miss Hovious has guided the children very carefully in this work.

This 8th grade group read an average of 8.6 books in the four months. The highest number reported by a student was 39, the lowest number 2. Because my room was used 4 periods of the 6 for a reading class, we were given a room library of about 100 volumes from the main library. This did not mean that the group could not have access to the main library. However, members of the class as they finished an assignment could pick up a book readily and use these extra moments in reading. Without books in the room this would have been impossible.

The boy who rated the lowest on the first test but who made improvement of 9 months did not report any books. However, he did read from a file of Reader's Digest that I had on the shelves. He would even come to my room after school to discuss the articles.

Supplementary lessons taken from Yoakam, Bagley and Knowlton were used from time to time. These additional lessons were given either to strengthen certain reading abilities or to introduce the group to a little different angle of the same reading problem. These books are indexed and

make good reference material. In Book III there is a chapter, "How to be your own movie critic" that fits in well with Miss Hovious's material on movies. Also in Book III there is a good chapter, "Word building and word knowledge" to use in connection with word clues. I used the three volumes to supplement Miss Hovious's material. The chapters I used dealt with eye movements, work with books, outlining main ideas and details, how to study, recognition, use of dictionary, how to make a report, retention and word building.

When children were given a chance to read what they pleased, they often chose one of "Learn to Read" volumes. Especially those students who found it difficult to become interested in a long story. I imagine the 4.5 reading vocabulary of Book I might help to explain why the poorer readers chose this volume.

Every speaker and every book or article on reading states that a teacher must begin with the student's interest wherever that interest lies. Improvement it may need, but begin with the level of the individual you are teaching. I suppose that no one so orthodox as I still exists. I want to give my experience along this line. One day I had announced to the class that the following day they might read what they chose. Two members asked if they might bring magazines from home. I quivered and inquired, "What magazine?" One said, "Esquire", the other "True Confession". I said, "Yes, bring them". I didn't feel very comfortable. I could just imagine a board member walking in that period. I managed to act unconcerned during this free reading period and found to my surprise that the rest of the group read the books they usually did without apparent notice of the magazines. And this boy and girl never asked to bring their magazines to class again.

After a year's experimenting with the problem of reading, we have come to some tentative conclusions which are influencing this coming year's reading program in the Compton Union Junior High Schools.

1. We will no longer call our course Remedial Reading. Our committee will continue its work under the new name of The Reading Improvement Curriculum Committee. The term "remedial" suggests a deficiency that parents resent.
2. Our results from the Iowa Silent Reading Tests show that good readers improved their abilities in many cases as much and more than the poor readers did their deficiencies. Because of this fact it seemed only fair to include whole classes in our reading program instead of only those pupils who fell below the 7th grade reading level.

This September finds our 900 entering 7th graders enrolled in the usual English class with 5 periods a week. Instructions, however, will be from Miss Hovious's mimeographed materials until her book "Adventuring the Printways" is published. Learning to Read will be used as supplementary material.

This decided change was only consummated after many conferences at which arguments for and against this new type of instruction were presented. The teachers who stand for formal grammar felt this material could never be turned into the type of lesson that they felt most valuable

in the training of their pupils in English.

3. We have determined the kind of Reading Record Sheet we want to use in our system this coming year. A sheet for each student, that will fit into a notebook, with the printed items on one side and the other side blank for remarks from the teachers seemed most practical. Most of the elementary schools in our district do not furnish case history records for the entering 7th graders. We determine I.Q. from the Stanford and Terman test which we give every 7th grader. The teachers by conferences with pupils and parents and observation learn the grades repeated, the grades skipped, the illnesses, the emotional disturbances, and the family background. This important information is transferred to the Reading Record Sheet.
4. The teachers will be granted visiting days. Visits will be made to either junior high schools carrying on reading work or to elementary schools doing outstanding work. Careful planning is always to precede these visits.
5. The teacher training angle is reduced considerably with the use of texts supplying as complete a teacher's manual as does "Adventuring the Printways". Last year we began a professional library for each junior high school. Copies of Gates, The Improvement of Reading (Revised Edition) and McCallister, Remedial and Corrective Instruction in Reading were obtained. This year we are adding to our small library the Thirty-Six Yearbook, Part 1, The Teaching of Reading. The chairman of the committee invites the teachers of the English classes to use the rather complete library she has built up. If publishing houses learn that a system is interested in reading material that system quickly collects many books.
6. The testing program will be as follows in the English classes:
 - a. Iowa Silent Reading Test to be given immediately. These are quite easily corrected.
 - b. Thorndike-McCall Reading Test to be given at the end of each six week period. This check will enable the pupil to see his improvement or it will enable him to correct his ways if he is falling down on the job.
 - c. Iowa Silent Reading Test--a different form--at the end of the 7th year.
7. A good room library. If only 50 volumes may be taken from the main library it will necessitate the teachers checking them in and out more frequently. I think this equipment most important in the carrying out of a reading program.
8. Stop watches were too expensive equipment. However, we found the Eastman Timer put out by Adams, Goodman Company at \$5.00 very satisfactory. Our system bought them through Penny's. Of course a wrist watch may be used, but if you really wish to be accurate a stop watch or timer is more reliable.

9. A form letter is to be sent home to tell the parents the improvement their child made during the year in reading.

10. Lastly, the most important piece of equipment--the teacher--and she must be chuck full of ingenuity if she is to succeed as a reading teacher.

THE VISUAL APPARATUS AND SCHOOL WORK

Clinton A. Wilson, M.D., Optometrist, Los Angeles

It is a fact that the eyes are a chief avenue of learning in our modern civilization. Estimates differ; but a figure of 80 per cent has been set by some as the proportion of visual learning. How much an individual learns by eye or by ear or otherwise, varies with the individual. This personal variation is caused by many different factors, visual and otherwise, all acting and interacting in extremely intricate ways which we do not thoroughly know at this time.

Let us consider briefly: 1st, what the visual apparatus is. 2nd, what it should normally enable us to do. And 3rd, how well in a large population the apparatus is equal to the demands put upon it.

The visual apparatus in its entirety consists of the eyes, the nerves, and brain areas carrying and recording sight, and the muscles which move and focus these eyes.

Their function is to enable us to see clearly and without resulting discomfort for considerable periods of time. In three short words: sustained comfortable vision.

This task of the visual apparatus is generally very well performed. Failures do occur because we are using to the limit a small very intricate machine which, from an engineering or mathematical point of view, is imperfect. In spite of all this, the failures are usually temporary.

By one means or another they can be gotten over and the load picked up again.

Now as to the frequency of imperfection detected by thoroughly testing a school population: Millions of children have been examined in this country, in Great Britain, and in Germany during the past 25 years. Only about 15 per cent of all pairs of eyes are optically perfect. Only about 4 per cent nearsighted. 75 to 80 per cent have some form of farsightedness, and of these at least one-third are more or less handicapped by their imperfection some time or other during school years. The exact figures vary with age groups, imperfections being commoner in the older more advanced groups.

One's first conclusion from these figures may be unhappy ones. But there is no cause for gloom. It is a biological law that physical perfection is not necessary for practical efficiency. Let us examine the facts then rather than accepting the reasoning in the case. The visual apparatus carries on very nicely with a minimum of servicing. But it is necessary that this minimum be attended to, and it is not expensive in time or money.

One example of the effects of these imperfections is published in E. A. Taylor's recent book on "Controlled Reading". He found that poor readers and failing students predominated among those carrying the un-

necessary extra burden caused by some form of uncorrected farsightedness. The relatively earlier onset of fatigue among the farsighted has been known to oculists for a long time, at least since the work of the great Dutch physician and physicist Donders, about 1850. It occurs because the farsighted person must expend more nerve and muscle energy in order to see well. Also it eventually produces an abnormal relation among the reflexes by which we see with both eyes simultaneously. Naturally such an overloaded visual apparatus will tire more quickly than a normal or normalized one. The work demanded of such an eye unaided can be compared to that required of the walking apparatus working uphill with a weight tied to each ankle. Try it some time.

The nearsighted person does not and cannot expend this extra energy because he sees his reading without it. Not seeing distant things is where this type is handicapped.

The normalizing procedure, the remedy, is a correctly determined pair of glasses, expertly fitted and used as indicated by the circumstances; usually only for reading or other work held in the hand or at equivalent distances.

Correct lenses correctly used will eliminate or reduce to endurable limits most of the exophorias, esophorias and hyperphorias of muscle imbalance; the eyeaches, limitability, restlessness and what not of fatigue due to over effort.

It is the remedy, simple, unexpensive and effective for most of the poor reading due to or exaggerated by visual apparatus defects. It is the first and most important thing. Less or otherwise is building upon the sands.

Most of the little odd muscle imbalances of which we hear so much are seldom as important as they are often assumed to be. Exercises of any of the various sorts fail in greater or lesser degree until the patient's glasses are within that angle of adaptability.

Exercises properly chosen and done are often helpful in breaking down burdensome eye habits and in creating better ones, after glasses, when necessary, have been placed before the eyes. And occasionally after proper exercises glasses can be discarded for at least a considerable period of the time.

There is, perhaps, too strong a tendency to regard slow and ineffective reading as due to some visual apparatus defect. This is natural enough, because seeing is the first and obvious function concerned with reading. We have much to learn about it yet, but the trend of present incomplete evidence is that visual apparatus defects can cause poor reading, but that they are seldom acting alone. More attention is being paid, as it should be, to the less obvious and more difficult problems arising from the 20 to 30 other causes of poor reading. Consider and examine the visual apparatus, of course, and especially its interactions with the other abilities or powers and systems of the individual.

The intrinsic intelligence and emotional stability of the person, factors in home life which are not always of a kind happily conducive to the development of a healthy interest in learning, brain injuries received at birth or later, diseases of the central nervous system, focal infections usually in the tonsils, teeth or paranasal sinuses, nasal obstructions, due to adenoid tissue or deviated nasal septum, sensitivity to foods or pollen causing hay-fever or hives, anemia from any cause, improper balance between the glands of internal secretion, personal popularity, and others all act and interact among themselves with and without visual apparatus defects.

Let us not lose sight of the fact that a defect in one area of a person may be reflected in another, and that years may separate effect and cause, especially in so complicated a mental process as effective reading. The true relation of cause and effect may be and usually is so very difficult to demonstrate that all of us fall into the old error of reasoning that after means because of.

So it comes down to this finally, as many things do these days: "What can the teacher do about it?" We know she will do all she can, and more than she should be expected to do.

In fairness to your pupils and yourselves you can and should only identify approximately that something is wrong. Then seek help in determining what it is.

Beware of diagnosis and treatment however intriguing they may be. You are trained for other work equally if not really more important, from which it is unfair to take your attention until necessary.

The help you will need, may perhaps be from the psychologist or psychiatrist, a social service worker in the community, a parole or truant officer, the parish clergyman, the parents, a brother or sister, the family physician or a physician interested in medical problems in the public schools. It is in these fields, it seems to me, that all of your knowledge, all your skill, as educators in the broader sense, and in social relations can be used with greater effectiveness.